5. INITIAL EVALUATION OF OU 10-08 NEW SITES AND GROUNDWATER

This section presents a summary of the Track 1 and 2 and ecological risk assessment processes that will be followed for all new sites evaluated under OU 10-08 and a summary of the remedial decisions for groundwater at each WAG that have been made to date. A brief summary of the TSF-08 site is provided to identify the limited scope for which WAG 10 is responsible. This initial evaluation of the sitewide groundwater includes the methodology to assess compliance with MCLs or other risk-based concentration for groundwater, general response actions (GRA), and preliminary identification of ARARs.

5.1 Initial Evaluation Processes for New Sites

The new site identification and Track 1 and 2 classifications were developed specifically for the INEEL to streamline the CERCLA process. The use of the Track 1 and Track 2 processes is intended to expedite decision-making and consensus among the regulatory parties by using a screening methodology and a phased approach. The Track 1 and Track 2 process has been used for the sites included in each completed Comprehensive ROD, and will be followed for all new sites evaluated under OU 10-08 using the FFA/CO (DOE-ID 1991) and associated guidance documents. The Track 1 and 2 process was developed based on the limited field investigation process described in national guidance. It is not a substitute for a baseline risk assessment, but allows pertinent information to be gathered that can be used to focus any additional required remedial investigation.

5.1.1 Track 1 Process

The Track 1 process can be found in the guidance document *Track 1 Sites: Guidance for Assessing Low Probability Hazard Sites at the INEL* (DOE/ID 1992). Track 1 sites are described as sites with a low probability of presenting a risk to human health or the environment. Rigorous quantitative risk analysis as outlined by CERCLA is not appropriate for Track 1 sites. This allows the funding required for a detailed investigation to be directed to known hazard locations. A conservative screening technique using humans as a sensitive indicator for the environment is employed during the Track 1 evaluation. This conservative screening technique, along with the collection of historical data, is used to develop the qualitative risk assessment.

At the end of a Track 1 investigation, a decision will be made concerning the site. Four outcomes are possible: 1) no significant data gaps and no unacceptable risk, so no further action is required; 2) although the site is still considered a low probability hazard site, additional data are needed to assess risk, so a Track 2 investigation will be initiated; 3) the site poses an unacceptable risk and sufficient information exists to select a remedy so an interim action will be initiated; or 4) a more detailed risk analysis or remedy selection is required, and the site will be incorporated into a RI/FS.

5.1.2 Track 2 Process

Track 2 sites are described as sites where insufficient data are available to make a decision concerning the risk level or to select or design a remedy. Track 2 investigations will require collecting data from the field and have a prescribed maximum duration of 18 months. The goal of the Track 2 process is to evaluate low probability hazard sites using existing qualitative and quantitative data to minimize the collection of new environmental data. A structured format is provided, which consists of a series of questions and tables. The guidance for the assessment of Track 2 sites is given in *Track 2 Sites: Guidance for Assessing Low Probability Hazard Sites at the INEL* (DOE/ID, 1993), and should be consulted for a detailed description.

The Track 2 process is iterative, and addresses the site from multiple perspectives to generate a reproducible and defensible evaluation. The data quality objective process is followed, and the process produces an approach to consolidate and assess existing data and set decision criteria. If necessary, the Track 2 process allows for the design of a sampling and analysis strategy to obtain new environmental data of an appropriate quality to support decisions for each site.

5.1.3 Ecological Risk Assessment Process

A site-specific methodology has been developed and documented in the Guidance for conducting Screening-Level Ecological Risk Assessment (SLERA) at the INEEL (VanHorn, Hampton, and Morris 1995) and updated in the OU 10-04 Work Plan (DOE-ID 1999). This guidance generally parallels the existing EPA guidance and was developed to direct the performance of consistent and reproducible SLERAs. The SLERA approach is to initially screen those sites that are uncontaminated (no source to the environment), because the site is inaccessible to the ecosystem of concern (no pathway to ecological receptors), or the site for other reasons poses limited risk to ecological receptors. This initial screenings should be done as quickly and inexpensively as possible however, priority should be given to avoiding the inappropriate elimination of a site.

5.2 OU 10-08 Track 1 Sites

To date, 47 Track 1s (Table 5-1) have been identified for inclusion in the FFA/CO Action Plan under WAG 10, OU 10-08 and have been sent to the agencies for approval. In addition to the original 47 Track 1s, several new sites have already been identified for inclusion and are following the Track 1 process. These Track 1s consist of homestead sites, rubble piles resulting from farming practices before the INEEL was established, mounds of soil resulting from soil depth studies and other miscellaneous suspect sites.

Table 5-1. OU 10-08 Track 1 Sites.

Site ID	Site Description	Status of Decision Document
1	Car Body South of HWY 33 on INEEL Boundary Road	Agencies approved. No Further Action.
2	Car Body Adjacent to Big Lost River	Track 1 completed. Awaiting Agency approval/signature.
3	Diesel-saturated Dirt Pile Near Experimental Field Station	Agencies approved. No Further Action.
4	Excavation Pit/Mound and Debris East of Guard Gate 3	Track 1 completed. Awaiting Agency approval/signature.
5	Cistern North of NRF	Track 1 completed. Awaiting Agency approval/signature.
6	Debris Near Cinder Pit on the INEL Southern Border	Agencies approved. No Further Action.
7	Debris Near Intersection of Highway 33 and 22	Agencies approved. No Further Action.
8	Debris South of Highway 33 East of TAN	Track 1 completed. Awaiting Agency approval/signature.

Table 5-1. (continued)

Site ID	Site Description	Status of Decision Document
9	Debris in Canal West of Guard Gate 3	Track 1 completed. Awaiting Agency approval/signature.
10	Excavation Pit/Mound and Debris East of Guard Gate 3	Track 1 completed. Awaiting Agency approval/signature.
11	Debris West of the Southern End of Highway 22	Agencies approved. No Further Action.
12	Debris North of Highway 33 Near the West Entrance	Agencies approved. No Further Action.
13	Debris Next to Canal Inside Boundary of NRF	Agencies approved. No Further Action.
14	Debris in the Big Lost River Sinks Area	Agencies approved. No Further Action.
15	Navy Debris in Canal Between TRA and NRF	Track 1 completed. Awaiting Agency approval/signature.
16	Farming Debris in Big Lost River Sinks Area	Track 1 completed. Awaiting Agency approval/signature.
17	Staining on East Butte Road	Track 1 completed. Awaiting Agency approval/signature.
18	Uncapped Well in Big Lost River Sinks Area	Track 1 completed. Awaiting Agency approval/signature.
19	Homestead Site at Birch Creek and Cedar Canyon Road	Agencies approved. No Further Action.
20	Stained Road Near NRF	Agencies approved. No Further Action.
21	Staining on Road 17 from STF to Portland Road	Track 1 completed. Awaiting Agency approval/signature.
22	Rusty Metal Debris Adjacent to Highway 28	Track 1 completed. Awaiting Agency approval/signature.
23	Debris in Birch Creek Drainage Gravel Pit	Agencies approved. No Further Action.
24	Homestead Site Northwest of SMC	Agencies approved. No Further Action.
25	Mounds, Cans, and Drums Northeast of NRF	Track 1 completed. Awaiting Agency approval/signature.
26	Detonation Pit Between NRF and TRA	Track 1 completed. Awaiting Agency approval/signature.
27	Mound Near East Portland/East Ogden Intersection	Track 1 completed. Awaiting Agency approval/signature.
28	Canal Builder's Campsite	Track 1 completed. Awaiting Agency approval/signature.

Table 5-1. (continued)

Site ID	Site Description	Status of Decision Document
29	Asphalt Near Main Guard Gate	Track 1 completed. Awaiting Agency approval/signature.
30	Debris on Richard Butte	Track 1 completed. Awaiting Agency approval/signature.
31	Two 8" Diameter Rounds	Track 1 completed. Awaiting Agency approval/signature.
32	Mound Near RWMC Gravel Pit	Track 1 completed. Awaiting Agency approval/signature.
33	Experimental Test Drum in EOCR-01 Leach Pond	Track 1 completed. Awaiting Agency approval/signature.
34	Howe Peak Diesel Spill	Track 1 completed. Awaiting Agency approval/signature.
35	Detonation Pits North of EOCR	Track 1 completed. Awaiting Agency approval/signature.
36	Debris Southwest of Highway 28	Track 1 completed. Awaiting Agency approval/signature.
37	Lids by Experimental Field Station	Track 1 completed. Awaiting Agency approval/signature.
38	Uncapped Well East of Argonne	Track 1 completed. Awaiting Agency approval/signature.
39	Ammunition Remains in EOCR Area	Track 1 completed. Awaiting Agency approval/signature.
40	Mound Southeast of EOCR Buildings	Track 1 completed. Awaiting Agency approval/signature.
41	Pits/Mounds Northeast of EOCR	Track 1 completed. Awaiting Agency approval/signature.
42	Construction Debris Northeast of EOCR	Track 1 completed. Awaiting Agency approval/signature.
43	Construction Pit Northwest of EOCR	Track 1 completed. Awaiting Agency approval/signature.
44	Concrete Lined Depression West of CFA	Track 1 completed. Awaiting Agency approval/signature.
45	Dirt Pile with Naval Smoke Cans Near INTEC	Track 1 completed. Awaiting Agency approval/signature.
46	Test Apparatus West of CFA	Track 1 completed. Awaiting Agency approval/signature.
47	Small Fuel Tank North of INTEC	Track 1 completed. Awaiting Agency approval/signature.

5.2.1 Test Area North–WAG 1 TSF-08

The Technical Support Facility (TSF)-08 site is located at Test Area North (TAN). Elemental mercury was used extensively at the Technical Support Facility (TSF) during the Heat Transfer Reactor Experiment (HTRE), which was part of the aircraft nuclear propulsion (ANP) program. The HTRE-I was modified and became the HTRE-II; neither used mercury. The HTRE-III was designed as a prototype for a nuclear-powered aircraft engine. The HTRE-III is now on exhibit at Experimental Breeder Reactor (EBR)-1 along with the HTRE-I/II. The HTRE-III reactor was air-cooled, water-moderated, and water-shielded during operation. When the reactor was not operating and required transportation or maintenance (to replace the jet engines, for example), the water shield tank was drained and refilled with mercury to shield workers from the reactor core. However, during operation of the reactor, the mercury was drained and the shield tank was again filled with water (Nicklaus et. al 1998).

Mercury beads were found on the soil near the TAN-647/648 storage location during the 1980s, and, in 1987, approximately 1.3 L (0.34 gal) were collected with a mercury vacuum. This is the site of the original reported mercury spill. Mercury spills were simply vacuumed up until 1978. From 1978 until the remedial action, spills were also monitored for gamma emitters before being collected. Since the radiological monitoring began in 1978, analytical data indicates mercury in the TSF area is not radiologically contaminated. Reclaimed mercury was sent to the Central Laboratory for reuse or recycling.

Between August and October 1994, a CERCLA time-critical removal action was conducted (Nicklaus et. al 1998). The removal action included the excavation and management of mercury-contaminated soil, gravel, and ties from the railroad bed. The goal of reducing mercury concentrations at TSF-08 to below 81 mg/kg, which is the risk-based soil concentration for an industrial use scenario, was met; however, remaining contamination exceeds acceptable levels for unrestricted residential use (Nicklaus et. al 1998).

Between October 1995 and April 1996, the excavated mercury-contaminated material was treated by means of a mobile retort system (Nicklaus et. al 1998). The total volume of material treated was approximately 247 m^3 (455 yd^3).

The OU 1-10 RI/FS evaluated the TSF-08 site in the OU 1-10 baseline risk assessment (DOE-ID 1997). The PRG for the residual contamination was reduced from 81 mg/kg to 1.9 mg/kg which is based on the concentration of mercury resulting in a HQ of 1 for the home grown produce ingestion route. The OU 1-10 ROD (DOE-ID 1999) stated that the TSF-08 site was selected for a phytoremediation treatability study under WAG 10 and would be remediated as necessary under WAG 1; however, the mercury site is now an OU 10-08 obligation for remediation, if necessary.

5.3 Existing Groundwater Conditions and Previous Remediation Decisions

5.3.1 Test Area North – WAG 1

TAN is in the north-central portion of the INEEL and is comprised of 4 different facilities; (1) the Technical Support Facility (TSF), (2) the Initial Engine Test (IET) facility, (3) the Water Reactor Research Test Facility (WRRTF), and (4) the Specific Manufacturing Capability (SMC)/Loss-of-Fluid Test (LOFT) facility. The TAN area is at the terminus of the Big Lost River, down gradient of Birch Creek and up gradient of the terminus of the Little Lost River.

The SRP aquifer lies approximately 200 feet below TAN. There is one known perched water zone under the facilities at TAN as a result of the TSF-07 Disposal Pond. Sampling of the perched water was performed between July 1990 and May 1991 for VOCs, metals, Sr-90, and gamma-emitters. Neither gamma-emitting radionuclides nor VOCs were detected. All the metals concentrations were within typical regional background concentrations. Strontium-90 was detected in concentrations up to 136 pCi/L. (Medina 1993). An interbed at approximately 134 m (440 ft) bls has created a confining layer in the aquifer that impedes the vertical movement of water and contaminants in the aquifer.

Contaminants in the TAN groundwater were first detected in April 1987. During groundwater sampling activities, TCE was detected in a sample collected for volatile organic compound (VOC) analyses from TSF production well TAN-1. Subsequent sampling of both production wells, TAN-1 and TAN-2, for VOCs during September and November 1987 confirmed the presence of TCE in both wells and also identified tetrachloroethylene (PCE) in well TAN-1. In addition, independent groundwater sampling at TAN was performed by the USGS in 1987 and 1988. Results from these investigations indicate that well TSF-05 and a nearby observation well, USGS-24, were contaminated with TCE and PCE at concentrations in excess of MCLs. Samples from well TSF-05 and the two production wells were also tested for selected radionuclides during these sampling efforts. Tritium and Strontium-90 were detected at concentrations in excess of MCLs in samples from well TSF-05. Cesium-137, cobalt-60 americium-241, and plutonium were also detected in well TSF-05.

A primary source of groundwater contamination at TAN is from the TSF-05 injection well, which was used from 1953 to 1972 for injection of waste from TAN process wastes. The TSF-05 injection well was constructed in 1953 to a depth of 305 ft. The well has a 12-inch-diameter casing with perforations from 180 to 244 ft and from 269 to 305 ft below land surface.

On the basis of the results from these early sampling efforts, a Resource Conservation and Recovery Act (RCRA) Corrective Action Program was developed to address groundwater contamination at TAN. One of the first actions initiated was the installation of an air sparger in the water supply system in 1989 to keep organic contaminant concentrations below drinking water standards. Another action initiated in 1990 removed and analyzed contaminated sludge that had accumulated in the lower 55 ft of the TSF-05 injection well. After the FFA/CO became final, Operable Unit 1-07 was created to address the groundwater at TAN. Operable Unit 1-07 was further divided into 2 operable units, OU 1-07A and OU 1-07B.

The 1992 interim action ROD for OU 1-07A addressed the TSF-05 injection well and surrounding groundwater contamination (TSF-23), and the groundwater contaminants near the TSF-05 injection well (DOE-ID 1992). The interim action identified in the OU 1-07A ROD was to extract and treat the groundwater using air stripping, carbon absorption and ion exchange until the action was no longer effective or until OU 1-07B ROD was signed.

OU 1-07B consists of the groundwater in the immediate vicinity of TAN, which has TCE concentrations greater than the MCL of 5 μg/L. The 1995 ROD for OU 1-07B (DOE-ID 1995) addressed the potential risk to human health and the environment from unacceptable concentrations of TCE, PCE, DCE, Sr-90, Cs-137, U-234 and H-3 in the groundwater. The remedy selected in the 1995 ROD, as amended in 2001, involved remediation of contaminated groundwater with TCE concentrations greater than 25 μg/L, containment of hot spots, and/or removal with above ground treatment (DOE/ID-2001a). This 1-07B remedy was implemented in 3 phases. Phase A completed and phased out all OU 1-07A activities.

The Groundwater Treatment Facility (GWTF) treated VOCs in a single pass during the first 2 to 3 years of Phase B implementation of hot spot containment. Radionuclide treatment was not expected to occur during this phase of the project. The treated water, which had contaminant concentrations above MCLs during this interim period, were reinjected upgradient of the extraction well within the hydraulic contaminant zone. Long-term containment goals will be met with a new treatment facility to be located approximately 2,000 feet downgradient of TSF-05.

The ROD for TSF-05 (DOE-ID 1995) identifies hydraulic and physical stressing of the hot spot to remove secondary source in the vicinity of TSF-05 during Phase A. To meet this objective, surge and stress would continue to remove secondary source during Phase B, subject to evaluation of early results, to better characterize the source area and provide data to evaluate restoration or containment of the hot spot core. During surge and stress cycles, the GWTF was to be operated in single pass mode (for both VOC and radionuclide treatment). The treated water was believed to have contaminant concentrations above MCLs and would be reinjected upgradient of the extraction well within the hydraulic containment zone.

The ROD for TSF-05 (DOE-ID 1995) also identified the strategy for long-term containment of the plume was to design, construct, and operate a new treatment system with extraction wells located approximately 2,000 feet downgradient from the injection well. Based on monitoring data collected at the new extraction location, influent TCE concentrations were expected to be approximately 1 mg/L. Influent radionuclide concentrations were anticipated to be below MCLs and not require radionuclide treatment.

As Phase C implements the remedies to achieve restoration of the greater than 25 ug/L TCE plume to within the 100 year restoration time frame, the data collected during the Phase C groundwater monitoring activities will be used to support 5-year remedy performance reviews as outlined in the Phase C remedial action O&M plan (DOE-ID 2001b). Phase C began in 2001 and the groundwater-monitoring plan (INEEL 1999) follows a strategy that alternates annually between routine, none, and statistical sampling. The strategy described in the plan will provide a full round of monitoring data once every 4 years, and a limited round of statistical sampling every 4 years that will be off-set by 2 years from the routine sampling rounds. Currently 58 wells have been selected for routine groundwater monitoring. Twenty-two of these wells have also been selected for the statistical sampling. The routine sampling entails single sampling events at each well over the summer, while the statistical sampling entails up to three sampling events at each of the 22 wells over a three month period. Groundwater samples will be analyzed for organics, inorganics and radiological contaminants. The monitoring plan also decreased the frequency of water level measurements to an annual event. Water level measurements will be taken in the 58 wells and an additional 19 wells located in and around TAN.

5.3.2 Test Reactor Area – WAG 2

WAG 2 consists of the area known as the Test Reactor Area (TRA). Contamination was introduced to the SRP aquifer from the TRA-05 disposal well, but no definitive or verifiable indications have shown that the TRA perched water system has impacted the aquifer. Beneath TRA, two distinct perched water zones, shallow and deep have been identified. Perched water occurs when downward flow of water to the aquifer is impeded by fine-grained sediments or dense underlying low permeable rock layers. The presence of perched water at TRA is directly related to infiltration from wastewater disposal ponds. The shallow perched groundwater occurs in the immediate vicinity of the historic ponds and retention basin and formed on the interface between the surficial alluvium and the underlying basalts at about 50 ft bls. Low permeability sediments and sediment infilling of fractures within the interbedded basalt-sediment sequence cause the deep-perched groundwater. The top of this second perched groundwater zone begins at approximately 140 ft bls and ends at depths of about 200 ft bls. Currently there are 24 perched water wells. Eighteen of these wells are monitored by the USGS; WAG 2 monitors the remaining 6 wells. Beneath TRA, the SRP aquifer lies approximately 480 ft bls. Currently, there are 5 wells in the SRP aquifer located downgradient from the TRA. Three of these wells are monitored by WAG 2 and the remaining 2 wells are monitored by the USGS.

The December 1992 Record of Decision for Operable Unit 2-12, TRA Perched Water System (DOE-ID 1992), evaluated both the perched water and Snake River Plain aquifer beneath TRA. The OU 2-12 ROD determined that no remedial action was necessary for the perched water system to ensure protection of human health and the environment. The computer modeling predicted that tritium in the Snake River Plain aquifer would meet its MCL during the year 2004 and chromium would meet its MCL by the year 2016. The 1992 ROD also stipulated that groundwater monitoring be conducted to verify the results of this modeling and a review of the monitoring system be conducted after 3 years. The post-ROD monitoring plan initiated semiannual sampling in the SRP aquifer and perched water wells. The 3-year monitoring review of this sampling determined that chromium and tritium concentrations in two of the SRP aquifer monitoring wells remained above MCLs.

The OU 2-13 Comprehensive Record of Decision for TRA (DOE-ID 1997) stated that the remedy selected in the OU 2-12 ROD continued to provide adequate protection of human health and the environment and any new requirements were unnecessary. The OU 2-13 ROD specified that a monitoring plan would be developed following its signature.

The January 2000 Groundwater Monitoring Plan for OU 2-13 (DOE/ID-10626) specifies that groundwater samples will be collected based upon the recommendations provided during the 3-year review of the OU 2-12 monitoring that the measured concentrations were below the predicted concentrations based on the OU 2-12 modeling, and that the USGS is also currently monitoring groundwater at the TRA. Once every 5 years, groundwater samples for all potential contaminants of concern identified at TRA will be sampled and analyzed for all monitoring wells as listed below. The groundwater monitoring and sampling will include:

- Semiannual Monitoring and Sampling:

  Semiannual monitoring and sampling will be performed for the constituents identified above the Idaho groundwater quality standards. This monitoring included cadmium, chromium, mercury, Co-60, SR-90 and tritium in the DPWS Wells PW-11, PW-12, PW-14, USGS-053, USGS-054, USGS-055, and USGS-056. The monitoring and sampling for tritium and chromium will be completed in the SRP aquifer Wells TRA-06A, TRA-07, TRA-08, USGS-058, and USGS-065. Also, SRP aquifer Well Highway 3 will be sampled for chromium only.

- Annual Monitoring and Sampling:

  Annual monitoring and sampling will complete the groundwater sampling presented above but will also include cadmium, Co-60, and SR-90 in the SRP aquifer wells.

- 5-Year Monitoring and Sampling:

  For the 5-year groundwater monitoring and sampling event, all wells identified for DPWS and the SRP aquifer will be sampled for Am-241, arsenic, beryllium, cadmium, cesium-137, chromium, cobalt-60 fluoride, lead, manganese, strontium-90, and tritium.

5.3.3 Idaho Nuclear Technology and Engineering Center–WAG 3

The groundwater beneath the Idaho Nuclear Technology and Engineering Center (INTEC), formerly known as the Idaho Chemical Processing Plant (ICPP), is separated into two groups. Group 4 consists of the perched water under INTEC and Group 5 consists of the Snake River Plain Aquifer. There are several zones of perched water in the basalts and sedimentary interbeds beneath INTEC. The perched water zones at INTEC are separate from the perched water at TRA. The first perched water occurs at the interface between the surface alluvium and the shallowest basalt flow. The second zone is further broken down into 2 zones, an upper and lower. The upper-second zone occurs at depths ranging from 113 and 119 ft bls and since it appears to be 2 discrete water bodies, this zone is frequently divided into the northern and southern zones. The lower-second zone occurs at depths between 128 and 135 ft bls. A deep perched water zone has been identified in the basalt at depths between 320 and 420 ft bls. The presence of perched water at INTEC is directly related to infiltration from precipitation, wastewater percolation ponds, the Big Lost River, sewage treatment ponds and from two instances when the injection well collapsed and service wastewater was released into the perched zones. The perched water at WAG 3 occurs when downward flow of water to the aquifer is impeded by fine-grained sediments or dense underlying low permeable rock layers. The perched water was evaluated in the baseline risk assessment for contaminants I-129, Sr-90, Np-237, Pu-238, Pu-239, Pu-240, Pu-241, U-234, U-235, U-238, Tc-99, Am-241 and mercury above regulatory levels. The perched water was not identified as posing risk to human heath or the environment in the comprehensive ROD for OU 3-13, however it can impact the Snake River Plain Aquifer through the transport of contaminants downward.

The perched water under INTEC is not used as a source of drinking water and is expected to disappear when INTEC operations cease. The OU 3-13 ROD (DOE-ID 1999) states that the remedial action for Group 4 would consist of institutional controls with aquifer recharge control. This action consists of enforcing existing institutional controls, implementing additional institutional controls to restrict future use of the perched water and phased remedies to control water infiltration and perched water releases to the aquifer. The phase 1 controls being implemented consist of surface water drainage modifications and controls, discontinuing lawn irrigation and removal of the percolation ponds from service. If these initial controls are ineffective, i.e., if the recession of the perched water zone does not occur as predicted by the RI/FS vadose zone model within 5 years of removing the percolation ponds, then the second phase would be implemented. The phase 2 could consist of lining or diverting the Big Lost River, repairing leaking water lines, curtailing steam condensate discharges to the subsurface, or removing the existing sewage treatment plant lagoons and infiltration galleries.

As part of the selected remedy, the moisture content and the contaminant concentrations will be measured in the perched water zones to verify that the perched water and the contaminant fluxes are decreasing as predicted in the vadose zone model and to determine potential impacts to the SRPA. In order to measure moisture and contaminant concentrations in the perched water, new vadose zone wells were installed and instrumentation was installed in both the new wells and the existing wells.

Subsequent to the ROD, Phase 2 was changed into 2 additional phases. A monitoring plan (DOE-ID 2000) was developed which discusses the monitoring and sampling for Phase IIa, and Phase IIb in the Group 4 perched water wells. Additionally a Phase III may be implemented if a decision is made to line the Big Lost River. The Phase IIa activities will consist of collecting information regarding the INTEC perched water zones during the time period from relocation of the percolation ponds to 5 years after relocation. Phase IIb will be implemented if lining of the Big Lost River is not required. The Phase IIb monitoring will basically be a continuation of Phase IIa with the possibility of some modifications.

After the completion of the additional Phase I and Phase II perched water wells, Group 4 will be comprised of a 40-well monitoring network depending on the number of existing wells with water in them. The details for the Group 4 monitoring and sampling are outlined in the Group 4 Monitoring Plan (DOE-ID 2000). At a minimum, the water samples will be analyzed for contaminants I-129, Sr-90, Np-237, Pu-238, Pu-239, Pu-240, Pu-241, U-234, U-235, U-238, Tc-99, Am-241, and mercury. The

Agencies have also requested that Group 4 analyze water samples for 1,1,1-trichloroethane, carbon tetrachloride, trichloroethylene, tetrachloroethylene, benzene, toluene, carbon disulfide, and pyridine. However, the VOC sampling may be discontinued if they are not detected at concentrations above MCLs in the initial sampling.

The Snake River Plain aquifer (Group 5) lies approximately 450 ft bls beneath INTEC. The source of contamination in the aquifer originates primarily from the injection well. The OU 3-13 ROD (DOE-ID 1999) identified an interim action as the selected remedy for Group 5. The ROD also states that while the remediation of contaminated SRP aquifer groundwater outside of the current INTEC fence is final, the final remedy for the contaminated portion of SRP aquifer inside of the INTEC fence line was deferred to OU 3-14. Modeling predicts that most of the contamination in the groundwater will fall below a 10E-04 risk factor by the year 2095. I-129, Sr-90, and Plutonium isotopes were the only contaminants determined to pose an unacceptable risk to a hypothetical future resident beyond the year 2095.

The interim action remedy consists of institutional controls with monitoring and contingent remediation. This interim action as documented in the OU 3-13 ROD includes:

- Implementation of institutional controls over the area of the aquifer that exceeds the MCLs for H-3, I-129, and Sr-90 to prevent groundwater use until drinking water standards are met.

- Construct new SRP aquifer monitoring wells outside the current INTEC security fence.

- Implement a pump and treatment remedial action at any well where the contaminant concentrations exceed action levels at a sustained pumping rate.

- Treatability studies will be conducted to evaluate the potential to treat and selectively withdraw contaminants from the aquifer.

- If the contamination in the groundwater is in sufficient quantities and it can be selectively extracted, the groundwater will be treated to meet MCLs outside the current fence at INTEC.

- Treated water will be returned to the aquifer.

A long-term monitoring plan, required by the OU 3-13 ROD, was developed for Group 5 (DOE-ID 2000). The monitoring plan guides the sampling and monitoring activities for the aquifer monitoring wells at INTEC and downgradient of INTEC. This data will be used to determine the effectiveness of the Group 5 interim action. After finalization of the long-term monitoring plan, 47 wells were sampled to establish a baseline for future monitoring. Twelve of these wells belong to the INEEL, the remaining 35 wells belong to the USGS and are located at INTEC and CFA. The baseline and annual groundwater samples will be analyzed for tritium, Tc-99, I-129, Sr-90, plutonium isotopes, uranium isotopes (U-234, -235, and -238), Am-241, Np-237, Cs-137, gross alpha/beta, mercury, and anions. During years 2 – 7 (2002 – 2007 calendar years) 20 aquifer wells will be sampled annually. In the following 8 – 16 years (2008 – 2016 calendar years), 20 aquifer wells will be sampled every other year. The list of analytes for these sampling events will be adjusted based on the results of the previous 6 years of data collection. In the following 17 - 100 years, groundwater sampling will be conducted once every 5 years. The list of analytes for these sampling events will be adjusted based on the results of the previous 16 years of data collection. Additionally, with the exception of the production wells, water level measurements will be taken at all existing INTEC area groundwater monitoring wells and several wells from surrounding areas. The measurements will be taken quarterly for the 2nd year. For years 3 and 4, measurements will then be taken twice a year. And then water level measurements will be taken annually for years 5 through 100.

5.3.4 Central Facilities Area – WAG 4

WAG 4 comprises the Central Facilities Area (CFA) that is located in the south-central portion of the INEEL. CFA has been used since 1949 to house many of the support services for all of the operations at the INEEL. The support services include laboratories, security, fire protection, medical, communication systems, warehouses, cafeteria, vehicle and equipment pools, bus system and laundry facilities.

The 1997 Post-ROD Monitoring Work Plan for the CFA Landfills I, II, and III (Neher 1997), identified the monitoring activities that would be performed to verify if the OU 4-12 remedial action remained protective to human health and the environment. The monitoring plan outlined 2 phases of site monitoring. A two-year intensive monitoring phase followed by a long-term monitoring phase. As part of the first 2-years of monitoring outlined in the Work Plan (Neher 1997), groundwater elevation data is to be collected from the 24 wells surrounding the CFA Landfills monthly for the first year and quarterly for the second year. Groundwater samples will be collected quarterly during the short-term monitoring phase with samples to be analyzed for VOCs, CLP metals, common anions and alkalinity. The second phase, the long-term groundwater monitoring, specifies that groundwater elevation data may be collected on an annual basis for years 3 through 5 and once every two years during years 6 through 30. Groundwater samples may be collected annually during years 3 through 5 and analyzed for metals and VOCs. During years 6 through 30, groundwater samples may be collected once every two years and analyzed for metals and VOCs.

The monitoring report prepared for the first 2-years of monitoring showed no constituents in the groundwater at WAG 4 above risk-based concentrations (INEEL/EXT 2000). The report also identified that lead and nitrates were at elevated concentrations. The lead concentrations in CFA-MON-A-003 were below the quality standard of 15 ug/L (IDAPA 16.01.11) in 1996. In 1997 a peak concentration of 44.8 ug/L was measured and measured concentrations have been decreasing since 1997.The most recent sampling reported a lead concentration of 13ug/L. The elevated nitrate concentration in CFA-MON-A-002 was initially measured at 21 mg/L in 1995 and has remained relatively stable having declined to 19.8 mg/L in the most recent sampling (October 17, 2001). The elevated nitrate concentrations in the CFA-MON-A-003 well have measured between 8.65 and 11 mg/L. This monitoring data was evaluated in the OU 4-13 Comprehensive RI/FS (DOE-ID 1999) and no unacceptable risks were identified for the groundwater pathway from sites at WAG 4. The OU 4-13 Comprehensive ROD (DOE-ID 2000) states that the groundwater monitoring for all wells at WAG 4 will be carried out under the Post-ROD Monitoring Work Plan (Neher 1997). The Comprehensive ROD also states that the State of Idaho and EPA will be notified annually of the nitrate concentrations as required by 40 CFR 141.11. After the concentration falls below the MCL of 10 mg/L, the annual reporting to the State and EPA will cease but the wells will continue to be monitored until such time as the 5-year review determines that continued monitoring is no longer necessary.

5.3.5 Auxiliary Reactor Area/Power Burst Facility – WAG 5

WAG 5 is in the south-central portion of the INEEL and is comprised of Auxiliary Reactor Area (ARA) and Power Burst Facility (PBF). The ARA consists of four separate operational areas and PBF consists of five separate operational areas. The depth to groundwater ranges from 420 ft to 455 ft bls. There are no perched water zones beneath WAG 5. There are eight groundwater-monitoring wells and four production wells located at WAG 5. Only two of the four production wells are active and the remaining two are at facilities that have been decommissioned and dismantled.

The results from three WAG 5 groundwater-sampling campaigns (i.e., April and July 1995 and August 1997) were used to develop the nature and extent of contamination at WAG 5 in the OU 5-12 Comprehensive RI/FS (Holdren et al. 1999). The detected concentrations were compared to risk-based concentrations (RBCs) developed by the EPA (1997) and the State of Idaho (Fromm 1996), maximum contaminant levels (MCLs) (EPA 1996), and Idaho groundwater quality standards (IDAPA 16.01.11.200). Risk estimates from GWSCREEN, a semi-analytical model for assessment of groundwater pathway from surface or buried contamination, were evaluated against risk and hazard index threshold values.

During the 1995 and 1997 groundwater sampling events, beryllium, iron, arsenic, and lead were detected in at least one groundwater sample at concentrations exceeding either the RBC or MCL. Evaluation of the four contaminants determined that beryllium, iron and arsenic did not pose an unacceptable risk. However, lead concentrations exceed the EPA action level and Idaho groundwater quality standard for lead of 15 μg/L (EPA 1996 and IDAPA 16.01.11.200). Sporadic high values have also been detected in the past but no clear trend could be determined because of the small data set available for analysis. By evaluating the combined dissolved lead data set, it was not possible to determine a statistically significant increase in lead concentrations in WAG 5 monitoring wells over those in the combined USGS data set.

The Final Record of Decision for Power Burst Facility and Auxiliary Reactor Area (DOE-ID 2000), signed in February 2000, specified that surveillance monitoring of the groundwater beneath the ARA and PBF facilities would resume as a component of the selected remedy for WAG 5. Groundwater monitoring was not required to satisfy WAG 5 remedial action objectives or cleanup goals, but used to reduce the uncertainty in previous sampling results and provide trend data to assess the possibility that an unidentified source of lead contamination is affecting the aquifer. The ROD also specified that samples will be collected annually until the first 5-year review for the OU 5-12 ROD. The first 5-year review is scheduled for June 2005. Based on the results of the 5-year review, DOE-ID, EPA, and IDHW will determine whether continued groundwater monitoring will be required at WAG 5.

The Groundwater Monitoring Plan for the Waste Area Group 5, Remedial Action (DOE-ID 2000) provides the guidance for implementing the requirements of the ROD at WAG 5. One round of sampling has already been performed under this monitoring plan and the results are presented in the FY2001 Groundwater Trend Report for WAG 5 (DOE-ID 2001).

5.3.6 Radioactive Waste Management Complex – WAG 7

The Radioactive Waste Management Complex (RWMC) lies in the southern central portion of the INEEL. Early in the history of the National Reactor Testing Station (NRTS), the Atomic Energy Commission (AEC) recognized the need to develop a local disposal ground for the solid radioactively contaminated waste that would be generated during the operation of nuclear reactors and associated facilities at the NRTS. The first trench at the Subsurface Disposal Area (SDA) was opened in 1952 as a disposal site for waste contaminated with radionuclides. For approximately 2 years, only mixed fission product waste was buried. In 1953 the AEC decided that waste generated by activities at the Rocky Flats Plant would be disposed of at the RWMC. The Rocky Flats waste consisted of transuranic waste as well as other hazardous substances such as organic and inorganic chemicals. The first shipment of Rocky Flats waste was received in 1954 for burial at the SDA. After 1972, transuranic waste was stored at the Transuranic Storage Area (TSA). Currently the SDA only receives low-level waste.

The depth to groundwater under WAG 7 is approximately 580 ft bls. The thickness of the aquifer is between 1,200 and 1,500 ft bls. The thickness of the active portion of the aquifer is about 250 ft. That is, the active portion, or the first 250 feet, of the aquifer is marked by cooler water flowing over warmer, stagnant water. The local direction of the aquifer flow is to the south-southwest.

Perched water zones have been encountered at depths of 80 to 100 ft bls and 180 to 230 ft beneath the SDA. These perched water zones have formed due to the low permeability sediments and sediment infilling of fractures within the interbedded basalt-sediment sequence cause the perched groundwater. The perched water zones are believed to be recharged by precipitation, the Big Lost River, and three floods that occurred in 1962, 1969, and 1982.

The contaminated groundwater at WAG 7 is found in the perched water zones and the aquifer. Normally, there is not enough water in the perched water zones to adequately sample for contaminant concentration. However, the contaminants often detected in the deep-perched water zone include antimony, arsenic, beryllium, chromium, lead, nickel, carbon tetrachloride, chloroform, TCE, and PCE. The primary source of contaminants in the aquifer and perched water zones is from the waste disposed at the SDA.

There are 15 groundwater aquifer wells currently being sampled at WAG 7. Of these wells 1 is administratively controlled by the USGS and the remaining 14 are controlled by WAG 7. Currently fission and activation products (C-14, Tc-99, I-129) Uranium isotopes, transuranic elements (plutonium, americium-241, and Np-237, VOCs and nitrates are being monitored in the aquifer by WAG 7.

Beginning the last quarter of 1992, monitoring of the wells at WAG 7 began quarterly sampling (Haney 1994) in support of the OU 7-13/14 Comprehensive RI/FS. The OU 7-13/14 Comprehensive RI/FS is scheduled to be completed in FY2002 and will address risk to human heath and the environment from the groundwater.

5.3.7 Waste Area Group 8 – Naval Reactors Facility

NRF is located over a portion of the SRP aquifer that possesses a lower gradient than the surrounding aquifer (DOE-PB 1998). Surface recharge from NRF operations increases the elevation of the water table under NRF, which results in a lobed shaped high in the water table on the east side of NRF. The high extends from the north side to the south side of NRF. In 1994, a well fitness evaluation was performed at NRF to determine the quality of the wells used in the NRF groundwater-monitoring network. At nearly the same time, NRF performed groundwater modeling, to assess aquifer flow paths near NRF and the optimal placement of groundwater monitoring wells. As a result of the fitness evaluation and modeling work, six new groundwater-monitoring wells were constructed and were included in the NRF groundwater-monitoring network. As of January 1996, the wells used in the groundwater monitoring network included five USGS wells and eight NRF wells. Of these wells, two are used to assess the general upgradient quality of the SRP aquifer, two are used to assess the effects on groundwater of effluent discharge to the industrial waste ditch, and six are located in a semi-circular arc just south of NRF and are used to sample the local SRP aquifer downgradient of NRF. The remaining three wells are located south of NRF and are used to sample the regional characteristics of the SRP aquifer downgradient of NRF.

Samples have been collected from the NRF groundwater-monitoring network since 1989. The recently constructed groundwater monitoring wells were specifically designed to monitor the upper 50 ft of the SRP aquifer. Results obtained from analyses of samples collected from the USGS wells are primarily used for screening purposes and for verifying that the new monitoring wells are sufficiently spaced so as to detect contamination from past or current activities at NRF.

Based on samples collected from nine downgradient wells, chromium, nitrates, tritium, and various salts were detected at slightly elevated levels. The average concentrations of these constituents occurring in groundwater monitoring wells downgradient of the source are as follows: chromium at 0.05 mg/L, nitrates at 2.3 mg/L, tritium at 308 pCi/L, and chloride at 226 mg/L. Based on samples collected from

1989 through the present, the chromium, nitrate, tritium and salt concentrations show no apparent increasing trend. Fate and transport modeling were performed during the RI/BRA (DOE-PB 1998) using GWSCREEN. All contaminants detected at OU 8-08 sites above risk-based concentrations in the soil were included in modeling runs to assess their potential migration to the aquifer. No contaminants were predicted to reach the aquifer within 100 years under normal precipitation conditions. Additional fate and transport analysis of past and current aquifer recharge points were performed and concluded that the industrial waste ditch, active NRF sewage lagoon and potential deep perched water associated with past discharges to the S1W leaching beds are the only NRF sites with appreciable quantities of contaminants currently migrating. Contaminants include trivalent chromium, tritium, nitrates, and various salts.

Perched water was found to be present at several locations beneath NRF. Perched water is found under the industrial waste ditch and under the NRF sewage lagoon. The contaminants present in the perched water under the industrial waste ditch are salts and chromium. The contaminants present in the perched water beneath the NRF sewage lagoon are nitrates, sodium and chloride. Two former shallow perched water zones, approximately 20–30 feet were known to exist in the early 1960s beneath the S1W and A1W leaching beds, but sampling performed during the remedial investigation show these perched water zones are no longer present.

Deep-perched water, in excess of 100 ft, may currently exist beneath the S1W leaching beds. The elevated levels of tritium currently detected in samples from the groundwater monitoring wells nearest to the S1W leaching beds are probably due to residual deep perched water which contains small amounts of tritium.

The hydrogeologic study concluded that NRF has had a limited impact on the SRP aquifer, primarily due to slightly elevated levels of chromium, nitrates, tritium, and various salts. Additionally these constituents have not shown an increasing trend and are not expected to increase in the future (NRF 1998 ROD).

As part of the selected remedy in the OU 8-08 ROD, groundwater monitoring was required to verify the effectiveness of the remedies (NRF 1998 ROD).

5.3.8 Waste Area Group 9 – Argonne National Laboratory

The Argonne National Laboratory (ANL-W) is located in the southeastern portion of the INEEL and has been identified as WAG 9. ANL-W is a prime operating contractor to DOE-Chicago (CH). ANL-W began a redirected nuclear research and development program in 1995. ANL-W is also currently in the process of conducting shutdown and termination activities for the EBR-II. Within the ANL-W site are a number of research and support facilities that contribute to the total volume of waste generated at ANL-W. These facilities currently generate radioactive low-level waste, radioactive transuranic waste, hazardous waste, mixed waste, sanitary waste, and industrial waste.

WAG 9 has 4 operable units (OUs). Within the 4 OUs are 37 known or suspected waste sites that were evaluated for contaminant releases to the environment. Two sites were further subdivided for evaluation. Therefore WAG 9 assessed 39 sites in the OU 9-04 RI/FS and the OU 9-04 ROD (ANL-W 1998a) and of these 39 sites, 33 were identified as requiring no further action.

Depth to groundwater is approximately 640 ft (195 m) beneath ANL-W and the groundwater flow direction is south-southwest. ANL-W has 5 monitoring wells under ANL-W control and one USGS well in the vicinity of Argonne. Drinking water for employees at ANL-W is obtained from two production wells located in the west-central portion of the ANL-W facility.

The GWSCREEN model was used to perform the groundwater fate and transport calculations for contaminants at ANL-W. Two contaminants were retained for the risk assessment modeling. All of the COCs were screened as contaminants of potential concern in the groundwater during the risk assessment (ANL-W 1998a).

The comprehensive ROD for ANL-W (ANL-W 1998) specified that semiannual groundwater monitoring will continue for at least 20 years (until the year 2018) in accordance with DOE Orders and the ANL-W Environmental Monitoring Plan (ANL-W 1998b).

5.4 Risk Assessment Approach

The primary purpose for the OU 10-08 is the assessment of the sitewide groundwater. Additional new surface sites, identified before the RI/FS, will also be evaluated as part of this OU.

5.4.1 Sitewide Groundwater Risk Assessment Approach

An approach will be developed for the sitewide groundwater risk assessment. This risk assessment approach will use historical process and characterization data as well as new data collected from representative wells, sampling of environmental media, and trending evaluations.

In general, extensive historical process information is available for groundwater contamination in the vicinity of the other WAGs. Each WAG as part of its RI/FS has evaluated groundwater downgradient of the WAG based on the approach documented in Burns (1995). The results of these assessments are documented in each of the individual RI/FSs. The results of these previous groundwater assessments are summarized in Section 5.3.

However, additional data is required to evaluate contaminant-specific trends. Once the trending evaluation is complete, a risk assessment will be performed to further delineate current risks posed by an identified contaminant plume. The objective is to better understand site risks in order to determine the need for remedial action and to prioritize future remedial action. The cumulative exposure to the SRPA groundwater will be then be compared against ARARs (i.e., MCLs), other acceptable levels, or risk-based concentrations that will result in less than a 1E-06 risk and 1.0 hazard index.

5.4.2 Risk Assessment Implementation

Risk assessments for the new sites may range from relatively simple screening evaluations (to decide to take action at an individual site or not), to more rigorous assessments (to determine if a waste site can be released), as outlined in the Track 1 and 2 approach and the SLERA Guidance (VanHorn, Hampton, and Morris 1995).

Contaminant screening will consist of comparing detected concentrations to INEEL background concentrations (Rood, Harris, and White, 1996) for both human and ecological receptors. For human health EPA 1E-06 risk-based concentrations (EPA 1995) for the most sensitive exposure pathway will then be used for screening. For ecological receptors, ecologically based screening levels (DOE-ID 1999) will be used for screening. Those contaminants that exceed the screening criteria will be identified as contaminants of potential concern and retained for analysis in the BRA. Risk-based levels for protectiveness are defined as a cumulative risk between 1E-6 and 1E-4 or HQ less than 1 for human receptors and HQ less than 10 for ecological receptors. The data obtained will be sufficient to evaluate the remedial alternatives and ultimately the selection of a remedial action.

5.4.2.1 Human Health Risk Assessment Implementation. For any new surface sites to be addressed under OU 10-08, the human health risk assessment used in the BRA will be based on the EPA's *Risk Assessment Guidance for Superfund Volume 1, Human Health Evaluation Manual (Part A)* (EPA 1989), the INEEL Track 2 guidance document (DOE 1994), and *the Guidance Protocol for the Performance of Cumulative Risk Assessments at the INEL (LITCO 1995).*

In general, tasks associated with development of the human health risk assessment can be categorized as follows:

- Data evaluation
- Exposure assessment
- Toxicity assessment
- Risk characterization
- Uncertainty analysis.

5.4.2.2 Ecological Risk Assessment Implementation. The OU 10-08 ecological risk assessment (ERA) will evaluate the potential risks of adverse ecological effect as a result of contamination at any potential 10-08 sites. The ERA will be based on guidance presented in EPA's framework for an ERA (EPA 1992) and will incorporate aspects of the *Guidance for Conducting Screening Level Ecological Risk Assessments at the INEL* (Van Horn et al. 1995). The primary goals of the OU 10-08 ERA are:

- Define the extent of contamination with respect to ecological receptors for each identified site of concern within OU 10-08
- Determine the actual or potential effects from contaminants on protected threatened and endangered or Category 2 wildlife species, habitats, or special environments at the site
- Identify sites and COPCs to be carried to the INEEL-wide ERA
- Provide input to the data gap analysis for the INEEL-wide ERA

The OU 10-08 ERA will apply a phased approach as described in Appendix D of the *Work Plan for Waste Area Groups 6 and 10 Operable Unit 10-04 Comprehensive Remedial Investigation/Feasibility Study,* (DOE/ID-10554, Rev. 0, April 1999) to achieve these goals for the ERA.

5.5 Preliminary Remedial Action Objectives and Development of General Response Actions

This subsection discusses preliminary remedial action objectives (RAOs) and development of remedial action alternatives for soil and groundwater. The RAOs and remedial action alternatives are not fully developed until the OU 10-08 RI/FS is complete.

5.5.1 Preliminary Remedial Action Objectives

RAOs are contaminant and media specific goals for protecting human health and the environment, which will be based both on ARARs and on the results of the human health and ecological risk assessments. The OU 10-08 RAOs will focus on achieving specific contaminant concentrations and/or eliminating contaminant migration pathways in soil and preventing contaminant ingestion from groundwater. The preliminary RAOs for contaminated OU 10-08 sites are as follows:

To protect human health in the future:

<u>New Sites/Soil Sites</u>

- Prevent direct exposure to COCs with excess cancer risk levels greater than 1E-04 and to noncarcinogenic COCs with HQs greater than 1
- Prevent ingestion of contaminated soils and food crops with a total excess cancer risk level of greater than 1E-04 and to noncarcinogenic COCs with HQs greater than 1
- Prevent inhalation of suspended radioactive and toxic materials posing excess cancer risk levels greater than 1E-04 and to noncarcinogenic COCs with HQs greater than 1
- Inhibit migration of COCs to groundwater at concentrations that would result in exceedance of MCLs, or other risk-based concentrations as appropriate, in the SRP aquifer
- Inhibit ecological receptor exposures to contaminated soils with concentrations of contaminants greater than or equal to 10.

<u>Sitewide Groundwater</u>

- Prevent ingestion and inhalation of ground water, and ingestion of homegrown produce with contaminant concentrations exceeding MCLs, or other risk-based concentrations, as appropriate.

5.5.2 Development of Remedial Action Alternatives

Alternatives for all non-groundwater contaminated media for OU 10-08 (pre ROD sites and sites identified too late to be evaluated in the RI/FS) will be developed in a focused FS following the approved Track 2 process. The focused FS will proceed concurrently with the RI; therefore, as a preliminary step, the response actions for non-groundwater contaminated media will be developed for remediation of COPCs. The current Track 2 process will ultimately result in identification of COCs, which will be used to complete the focused FS. The groundwater is not anticipated to require a FS as the individual WAGs are assumed to have succeeded in their remediation of their contaminant plumes. General response actions for groundwater are anticipated to be no action or limited action, such as institutional controls and monitoring.

New surface sites that may be assigned to WAG 10, OU 10-08 during the post-ROD time frame will be addressed using the alternatives identified in the focused FS.

Preliminary general response actions have been identified based on current known site conditions, prior remediation experience at the INEEL, engineering judgment, and NCP guidelines (40 CFR 300). The list is preliminary and will be modified after screening technology types for effectiveness and technical implementability. This evaluation will focus on potential effectiveness of process options in handling the estimated volumes of contaminants in specific environmental media, meeting RAOs, impacts to human health and the environment, reliability of the process with respect to the contaminants and site conditions, and cost. Cost information used will be relative capital and operating and maintenance costs.

The following general response actions have been identified for OU 10-08 surface sites:

- ***No Action*****—**This alternative requires no monitoring and/or remediation of the new/soil sites.

- ***Limited Action***—Limited action can include monitoring and access restrictions. Monitoring is used to detect any releases that could have an impact to the SRPA and to assess whether remedial actions are protective of receptors. Access restrictions are intended to prevent or reduce exposure to onsite contamination. This may be accomplished through fencing and deed restrictions to limit use of the property.

- ***Containment***—Refers to technologies that isolate contaminants and mitigate offsite migration through engineering controls. A cover or cap consisting of a native soil cover, single barrier (i.e., clay), or composite barrier (i.e., clay plus flexible membrane liner) may be considered.

- ***In Situ Treatment***—Refers to technologies that physically or chemically modify the soils or waste in place, such as grouting and in situ vitrification, which isolate contaminants and mitigate offsite migration through engineering controls. A cover or cap consisting of a native soil cover, single barrier (i.e., clay), or composite barrier (i.e., clay plus flexible membrane liner) may be considered. Containment may also be a component of an in situ treatment alternative.

- ***Removal and Ex Situ Treatment, Storage, and Disposal***—Under this response action, contaminated soils or waste would be retrieved, treated if required, and disposed at an appropriate facility.

- ***Surface Controls***—Surface control technologies are designed to control and direct site runoff and prevent offsite surface water from running onto the site. Examples of surface control technologies include grading and vegetation.

These response actions will be further developed as additional information is obtained and evaluated on the contaminated media, and as RAOs and ARARs are refined. Data will be compiled to identify volumes, areas, and depths of media to which response actions will apply, and the chemical and physical characterization of the site applicable to these response actions. A range of preliminary alternatives will be developed by combining the representative process options for technology types to address the RAOs for contaminated media within OU 10-08.

Alternatives will be screened on the basis of threshold criteria. Those not meeting threshold criteria will not be further evaluated for implementability, feasibility, and cost. Both technical and administrative implementability will be considered in evaluating the alternatives. In terms of effectiveness, each alternative will be evaluated for overall protection of human health and the environment, and reduction of toxicity, mobility and volume through treatment. Cost estimates will be based on standard cost-estimating data; present worth analyses will be used to evaluate expenditures that occur over different time periods. The alternatives remaining after screening will be evaluated in detail using the nine CERCLA criteria:

Threshold Criteria

1. Overall protectiveness

2. Compliance with ARARs

Balancing Criteria

1. Long-term effectiveness and permanence

2. Reduction of mobility, toxicity, or volume through treatment

3. Short-term effectiveness

4. Implementability

5. Cost

Modifying Criteria

1. State acceptance

2. Community acceptance.

After the individual analyses are complete, the alternatives will be compared and contrasted relative to each of the evaluation criteria.

The following general response actions have been identified for OU 10-08 groundwater sites:

- *No Action*—This alternative requires no monitoring and/or remediation of the groundwater.

- *Limited Action*—Monitoring of groundwater and institutional controls.

5.6 Identification of Potentially Applicable or Relevant and Appropriate Requirements

This section initially identifies ARARs for remediation activities at OU 10-08 sites. The list represents a preliminary identification of ARARs based on site characteristics and contaminants at the site. Further identification and definition of ARARs will be completed as remedial action alternatives are defined and then presented in the RI/FS, the proposed plan, and the ROD.

The CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 (42 USC § 9601 et seq.), requires the selection of remedial actions that satisfy two threshold criteria: (1) overall protection of human health and the environment, and (2) compliance with ARARs. Remedies must address substantive standards, requirements, criteria, or limitations under any federal environmental law and any promulgated state environmental requirements, standards, criteria, or limitations that are more stringent than the corresponding federal standards. In addition, the importance of nonpromulgated criteria or other advisory information to be considered is formally recognized in the NCP in the development of remediation goals or cleanup levels. This information is labeled to-be-considered (TBC) criteria.

The EPA has specified that potential ARARs identified for a site should be considered at various points in the remediation planning process (52 FR 32496). These points include the following:

- During scoping of the RI/FS, chemical- and location-specific ARARs will be identified on a preliminary basis.

- During the site characterization phase of the RI, when the baseline public health evaluation is conducted to assess risk at a given site, chemical-specific ARARs and TBC criteria are identified more comprehensively and are used to help identify preliminary RAOs.

- During the focused FS location-and action-specific ARARs are identified under each alternative evaluated in the detailed analysis of alternatives. Changes in regulatory requirements can be assessed through the development of the ROD.

5.6.1 Preliminary ARARs Identification

Potential federal and state ARARs are presented in Table 5-2. Detailed evaluation and modification to these potential ARARs will occur during the FS phase of the RI/FS process.

5.6.1.1 Action-Specific ARARs. Action-specific ARARs are technology- or activity-based requirements for actions taken at a site. Action-specific ARARs generally do not guide the development of remedial action alternatives, but rather indicate how the selected remedy must be implemented.

Action-specific ARARs that could be pertinent to OU 10-08 sites are state hazardous waste regulations (for management of remediation waste and performance standards for waste left in place) and state and federal regulations related to air emissions.

5.6.1.2 Chemical-Specific ARARs. Chemical-specific ARARs are usually health- or risk-based numerical substantive requirements of the values or methodologies that, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amounts or concentrations of a chemical that may be found in, or discharged to, the ambient environment.

In both the NCP and the *CERCLA Compliance with Other Laws Manual* (EPA 1988), the EPA specifies that when ARARs are not available for a given chemical, or when such chemical-specific ARARS are not sufficient to be protective, risk-based levels should be identified or developed to ensure that a remedy is protective. Both carcinogenic and noncarcinogenic effects are considered in determining risk-based levels and evaluating protectiveness. For carcinogenic effects, the health advisory or risk-based levels are selected to ensure that the total lifetime risk to the exposed population of all contaminants falls within the acceptable range of 1E-04 to 1E-06. The 1E-06 risk level is specified by the EPA as a point-of-departure for determining remediation goals. For noncarcinogenic effects, cleanup levels should be based on acceptable levels of exposure as determined by EPA reference doses, taking into account the effects of other contaminants at the site. Therefore, chemical-specific ARARs serve two primary purposes:

- To identify the requirements that must be met as a minimum by a selected remedial action alternative (unless a waiver is obtained)

- To provide a basis for establishing appropriate cleanup levels.

The chemical-specific ARARs likely to be most pertinent to remediation of OU 10-08 sites are the *Idaho Ground Water Quality Rule*, *Idaho Rules for Public Drinking Water Systems*, and *Idaho Water Quality Standards (Surface Water)* in determining whether site remediation is protective of groundwater and surface water (i.e., the Big Lost River, Little Lost River, and Birch Creek). Hazardous waste land disposal restrictions will also be important standards during the management of wastes generated during remedial actions. DOE Orders for radiation protection will be an important TBC for remediation of any radioactively contaminated OU 10-08 site. The State of Idaho *Risk-based Corrective Action Guidance Document for Petroleum Releases* will be a pertinent TBC for establishing remediation requirements for any OU 10-08 site contaminated from a petroleum release.

Table 5-2. Potential ARARs identified for WAG 10.

Citation	ARAR Provision	Type	ARAR or TBC
IDAPA 58.01.05 (40 CFR 260-264)	Rules and Standards for Hazardous Waste	Action	ARAR
IDAPA 58.01.01	Rules for the Control of Air Pollution in Idaho	Action	ARAR
40 CFR 61	National Emission Standard for Hazardous Air Pollutants (NESHAP)	Action	ARAR
40 CFR 266	Military Munitions Rule	Action	ARAR
DOD Standard 6055.9, Chapter 12	Real Property Contaminated with Munition, Explosives, or Chemical Agents	Action	TBC
IDAPA 58.01.02	Idaho Water Quality Standards (Surface Water)	Chemical	ARAR
IDAPA 58.01.08 (40 CFR 141-143)	Idaho Rules for Public Drinking Water Systems	Chemical	ARAR
IDAPA 58.01.11	Idaho Ground Water [tjh6]Quality Rule	Chemical	ARAR
IDAPA 58.01.05.011 (40 CFR 268)	Land Disposal Restrictions	Chemical	ARAR
DOE Order 435.1	Radiation Protection of the Public and Environment	Chemical	TBC
State of Idaho Guidance	Risk-based Corrective Action Guidance Document for Petroleum Releases	Chemical	TBC
36 CFR 800	National Historic Preservation Act	Location	ARAR
25 USC 32	Native American Graves Protection and Repatriation Act	Location	ARAR
50 CFR 402	Endangered Species Act	Location	ARAR
16 USC 715	Migratory Bird Conservation Act	Location	ARAR

5.6.1.3 Location-Specific ARARs. A number of statutes have requirements related to activities occurring in particular locations. Location-specific ARARs are regulatory requirements or restrictions placed on activities in specific locations that must be met by a given remedial action. Location-specific ARARs potentially pertinent to remediation of WAG 10 sites include the *National Historic Preservation Act* and the *Native American Graves Protection and Repatriation Act* (for preservation of important cultural resources), and the *Endangered Species Act* and *Migratory Bird Conservation Act* (for protection of endangered and threatened species during remediation activities).

5.6.1.4 To-Be-considered Criteria, Advisories, or Guidance. To-be-considered (TBC) criteria are advisories, guidelines, or policies that do not meet the definition of ARARs. TCB criteria may assist in determining protective criteria in the absence of specific ARARs. Preliminary TBC criteria for the WAG 10 OU 10-08 include the following:

- DOE orders
- Executive orders
- Federal and State rules pertaining to relevant subjects that are not promulgated criteria, limits, or standards (by definition of Section 121[d] of CERCLA)
- EPA guidance documents
- Remedial action decisions at similar Superfund sites.

5.7 References

40 CFR 300, Title 40, "Protection of Environment," Chapter 1, "Environmental Protection Agency," Part 300 "National Oil and Hazardous Substance Pollution Contingency Plan," *Code of Federal Regulations*.

42 USC § 6901 et seq. 1986, "Comprehensive Environmental Response, Compensation, and Liability Act of 1986 (CERCLA/Superfund)," *United States Code.*

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6. WORK PLAN APPROACH AND RATIONALE

Waste Area Group (WAG) 10, Operable Unit (OU) 10-08 includes potentially contaminated (radioactive and nonradioactive) groundwater, surface soil (New Sites), and HTRE III mercury spill site (TSF-08). In accordance with the *Federal Facility Agreement and Consent Order*, the WAG 10, OU 10-08 project at the Idaho National Engineering and Environmental Laboratory will assess site-wide integrated groundwater concerns for contaminant flux through the site (with emphasis on the downgradient boundary), investigate newly identified sites that will not be assigned to other WAGs, and evaluate the potential for application of phytoremediation to the TSF-08 location at WAG 1 (Test Area North –TAN).

The data quality objectives RI/FS (DQOs) effort involves establishing the data and information basis for the WAG 10, OU 10-08 RI/FS. The RI/FS groundwater scope will include developing the capability to assess the current and future groundwater quality for the downgradient INEEL boundary through evaluation of historical data from the ERIS, USGS and the individual groundwater operable units. The schedule for performing the OU 10-08 RI, as outlined in the OU 10-04 Work Plan, allows for minimal collection of new data to support the OU 10-08 RI report. Therefore, groundwater tasks that might be useful to complete the OU 10-08 RI will be proposed to be performed under OU 10-08 post-ROD. This approach is based on the key assumption for the OU 10-08 RI/FS that the RODs for the groundwater operable units will be successfully executed by the individual WAGS. This means that the current and future groundwater remediation will reduce groundwater risks to acceptable levels and the OU 10-08 groundwater assessment will not require an FS. The main focus of OU 10-08 will be the long-term monitoring of groundwater for the 100-year time frame identified in the FFA/CO. The sitewide groundwater contaminant information and data can be used to evaluate whether compliance with MCLs or other acceptable risk-based concentrations defined for OU 10-08 have been met.

The established Track 2 process, includes the development of DQOs, and will be applied to newly identified surface sites. The current new sites in the Track 2 process will use the Track 2 guidance document (reference – DOE, 1994: *Track 2 Sites: Guidance for Assessing Low Probability Hazard Sites at INEL*, DOE/ID-10389. Idaho Field Office, Idaho Falls, ID. Revision 6, July) to develop site-specific DQOs as necessary. Therefore, only the DQOs for the integrated groundwater assessment will be further discussed.

6.1 Data Quality Objectives

The DQO process (Environmental Protection Agency [EPA], 2000) was followed using a graded approach to determine the path forward for the OU 10-08 RI/FS Work Plan. The DQO process is a seven-step planning approach that is used to assist the remediation process and data collection strategy consistent with data uses and needs. The goals of the process are to provide the data needed to refine the preliminary conceptual contaminant distribution model and support remedial decisions. A team of subject matter experts and key decision-makers implemented the graded DQO process for OU 10-08. Subject matter experts provided input on regulatory issues, the history and physical condition of the site, and sampling and analysis methods. Key decision-makers from the Department of Energy (DOE), Idaho Department of Environmental Quality (IDEQ), and the EPA participated in the process to develop the approach and rationale for data needs. The DQO covered the DQOs for the OU 10-08 groundwater as well as long term monitoring and stewardship. The DQOs that are pertinent to the preparation of the OU 10-08 RI/FS are summarized below. The DQO process provides a degree of confidence that the right type and quality of data are collected to fulfill informational needs of the OU 10-08 decisional process. During the DQO process the original directions and decisions identified for OU 10-08 in the OU 10-04 work plan were still considered valid. In addition the following assumptions were made during the DQO process:

1. Historical groundwater data would be consolidated and reviewed to eliminate the need for collecting new data to the extent practicable, and

2. The groundwater data previously obtained for other site activities are of sufficient quality to help support the OU 10-08 RI/FS decision process. However, new sites that are not fully characterized may require additional data collection in order to determine the threat of theses site to groundwater. During the DQO process it was agreed that no new DQOs would be developed for the TSF-08 site, as this location would only evaluate the potential to use phytoremediation to remediate the inorganic/elemental mercury.

6.1.1 Step 1 – State the Problem

Historical operations at the INEEL over the past 50 years introduced radioactive and/or hazardous contaminants into the environment (see Table 6-1). A number of these contaminants have entered or may in the future enter the SRP aquifer beneath the INEEL.

The need to identify and remediate the aquifer is being addressed by the individual groundwater operable units. Historical groundwater data will be used to assess potential impacts of groundwater compliance with MCLs, or other risk-based concentrations as appropriate, in the downgradient portion of the site. While the historical data provides an indication of what may be expected for impacts in the groundwater, the data is suspected to be insufficient for assessment of compliance with MCLs, or other acceptable risk-based concentrations during the future 100 year time frame.

The following are stated as problems in this DQO:

1. What data are required to assess current conditions and future changes in the nature and extent of contamination plumes at the downgradient INEEL boundary?

2. How will the effectiveness of remedial actions be measured to determine whether groundwater concentrations of selected COCs meet the regulatory standard (drinking water maximum contaminant levels [MCLs]) or other acceptable risk-based concentrations at the INEEL boundary, which is downgradient from the sources of contamination?

3. How will the effectiveness of remedial actions be measured to determine whether groundwater concentrations of selected COCs meet the regulatory standard (drinking water maximum contaminant levels [MCLs]) or other acceptable risk-based concentrations at all locations beneath the INEEL by 2095?

Table 6-1. Groundwater COCs Presently Identified in Existing RODs at the INEEL.

Contaminant Type	Contaminant Name	ROD-Specified COCs (by Facility)
Organics:	Carbon Tetrachloride	RWMC[a]
(Volatile Organic	cis-1,2-Dichloroethene (cis-1,2-DCE)	TAN[b]
Compounds)	Methylene Chloride (Dichloromethane)	RWMC
	Tetrachloroethylene	RWMC
	trans-1,2-Dichloroethene (trans-1,2-DCE)	TAN
	Trichloroethene (TCE)	TAN
Inorganics:		
Metals:		
	Arsenic (As)	TRA[c], INTEC[d], ANL-W[e]
	Beryllium (Be)	TRA, CFA[f]
	Cadmium (Cd)	TRA, CFA
	Chromium (Cr)	TRA, INTEC, ANL-W
	Lead (Pb)	TRA, ARA, PBF
	Manganese (Mn)	TRA
	Mercury (Hg)	TRA, INTEC
	Zinc (Zn)	CFA
Other:	Fluoride (F)	TRA
	Nitrate (as Nitrogen)	CFA
	UXO (RDX, TNT)	As Necessary
Radionuclides:	Gross alpha	Part of TAN, TRA, INTEC, RWMC
	Gross beta	Part of TAN, TRA, INTEC, RWMC
	Gamma emitters	Part of TAN, TRA, INTEC, RWMC
	Uranium (U) & daughters	TAN, INTEC, RWMC
	Iodine-129 (I-129)	INTEC, RWMC
	Plutonium (Pu) & daughters Pu 239/240, Am 241	INTEC, RWMC
	Strontium-90 (Sr-90)	TAN, TRA, INTEC
	Technetium-99 (Tc-99)	INTEC, RWMC
	Tritium (H-3)	TAN, TRA, INTEC, RWMC
	Carbon 14	RWMC

a. Radioactive Waste Management Complex
b. Test Area North
c. Test Reactor Area
d. Idaho Nuclear Technology and Engineering Center
e. Argonne National Laboratory-West
f. Central Facilities Area

6.1.2 Step 2 – Identify the Decision

Table 6-2 presents the principal study question (PSQ) and the decision statements (DS) developed to resolve the problems of the project and the alternative actions that could stem from the implementation of those decisions.

Table 6-2. WAG 10, OU 10-08 Decisions and Alternative Actions.

PSQ	Alternative Action	Consequences of Implementing the Wrong Alternative Action	Severity of Consequences (Low/Moderate/Severe)
PSQ #1 – Are down gradient nature and extent of all contamination plumes within WAG 10, OU 10-08 defined?			
1a	Yes. Monitoring data and information can be used to assess qualitative groundwater risks and current/future contaminant compliance with MCLs or other risk-based concentrations.	Groundwater contamination that presents a risk to receptors off the INEEL could migrate beyond the INEEL boundary and not be detected.	Severe
1b	No. Additional monitoring data and information are needed to assess groundwater quality compliance with MCLs or other risk-based concentrations today and for the future.	Unneeded groundwater monitoring.	Low
DS #1 – The groundwater contamination plumes are/are not defined.			
PSQ #2 – Are groundwater contamination concentrations within the INEEL projected to comply with MCLs or other acceptable risk-based concentrations in 100 years?			
2a	Yes. Monitoring requirements will be re-assessed and revised as necessary.	Groundwater contamination that presents a risk to receptors off the INEEL could migrate beyond the INEEL boundary and not be detected.	Severe
2b	No. The investigation will be expanded as a post-ROD activity.	Unneeded groundwater monitoring.	Low
DS #2 – Groundwater will not/will exceed MCLs or other acceptable risk-based concentrations in 100 years.			

6.1.3 Step 3 – Identify the Inputs to the Decision

Existing historical groundwater data are not sufficient to satisfy either of the following input/data required to support the two decisions listed in Step 2 for this project.

Plume-specific and background groundwater data are needed to:

1. Verify COPC presence/absence (i.e., nature of groundwater contamination) in the down gradient and perimeter wells
2. Quantify contaminant concentrations
3. Support assessment of compliance with MCLs or other risk-based concentrations now and in the future
4. Verify if well locations are adequate to assess downgradient compliance with MCLs or other acceptable risk-based concentrations.

Additional data may be required to address the above needs. The OU 10-08 team will use the current INEEL standard sampling methods used by Environmental Monitoring to collect samples. The analytical methods to be used are those currently provided by the Sample Management Office for analysis of groundwater. The basis for setting the action level is groundwater MCLs or other risk-based concentrations. To ensure methods meet the required detection limits, the laboratory will be required to meet a practical quantitation limit (PQL) of 50% or less of the MCL. The ER Quality Assurance Project Plan (QAPjP) and OU 10-08 Field Sampling Plan will specify the methodology to be used and the quality control (QC) procedures to be implemented.

Table 6-3 lists all analytes detected and monitored in groundwater at the INEEL, any of which could become COPCs for OU 10-08. The table identifies radioactive and nonradioactive contaminants and the data quality requirements for each identified COPC.

The basis of setting the action levels in groundwater is utilization of MCLs and risk-based volumes.

Table 6-3. List of Selected Sitewide Groundwater Contaminants.

For Sitewide groundwater sampling and analysis							
Contaminant Type	Contaminant Name	Action Level (MCLs)	Analytical Method	PQL Required (50% or less of MCL)	CAS#	Accuracy (%)	Precision (%)
Organics (Volatile Organic Compounds)	Carbon Tetrachloride	0.005 mg/L	Method 8260-B	0.001 mg/L[a]	56-23-5	[b]	[b]
	cis-1,2-Dichloroethene (cis-1,2-DCE)	0.007 mg/L	Method 8260-B	0.001 mg/L[a]	156-59-2	[b]	[b]
	Methylene Chloride (Dichloromethane)	0.005 mg/L	Method 8260-B	0.001 mg/L[a]	75-09-2	[b]	[b]
	Tetrachloroethylene (PCE)	0.005 mg/L	Method 8260-B	0.001 mg/L[a]	127-18-4	[b]	[b]
	trans-1,2-Dichloroethene (trans-1,2-DCE)	0.1 mg/L	Method 8260-B	0.001 mg/L[a]	156-60-5	[b]	[b]
	Trichloroethene (TCE)	0.005 mg/L	Method 8260-B	0.001 mg/L[a]	79-01-6	[b]	[b]
Inorganics							
Metals	Arsenic (As)	0.05 mg/L	[e]	0.01 mg/L	7440-38-2	+/- 30%	+/- 20%
	Beryllium (Be)	0.004 mg/L	[e]	0.0008 mg/L	7440-41-7	+/- 30%	+/- 20%
	Cadmium (Cd)	0.005 mg/L	[e]	0.001mg/L	7440-43-9	+/- 30%	+/- 20%
	Chromium (Cr)	0.1 mg/L (total)	[e]	0.01 mg/L	7440-47-3	+/- 30%	+/- 20%
	Lead (Pb)	Action Level = 0.015 mg/L	[e]	0.003 mg/L	7439-92-1	+/- 30%	+/- 20%
	Manganese[c]	0.05 mg/L	[e]	0.01 mg/L	7439-96-5	+/- 30%	+/- 20%
	Mercury (Hg)	0.002 mg/L	[e]	0.0002 mg/L	7439-97-6	+/- 30%	+/- 20%
	Zinc	5 mg/L (SDWS[d])	[e]	0.020 mg/L	7440-66-6	+/- 30%	+/- 20%
Other	Fluoride (F)[c]	2 mg/L (SDWS[d]) 4 mg/L primary drinking water std.	[f]	0.4 mg/L	16984-48-8	+/- 40%	+/- 20%
	Nitrate (as Nitrogen)	10 mg/L	[g]	2 mg/L	14797-65-0[h]	+/- 40%	+/- 20%
	RDX[p]	0.03 mg/L[o]	Method 8330	0.015 mg/L	121-82-4	+/- 40%	+/- 20%
	TNT	0.1 mg/L[o]	Method 8330	0.05 mg/L	118-96-7	+/- 40%	+/- 20%
Radionuclides	Gross Alpha	15 pCi/L - Total	EPA Method 900.0 (GFP[i])	4 pCi/L	12587-46-1	+/- 20%[j]	+/- 25%[j]
	Gross Beta	Not to Exceed 4 mrem/yr Effective Dose Equivalent	EPA Method 900.0 (GFP[i])	4 pCi/L	12587-47-2	+/- 20%[j]	+/- 25%[j]
	Gamma emitters	15 pCi/L - Total	Gamma Spec.	3 pCi/L		+/- 20%[j]	+/- 25%[j]
	Uranium (U) & daughters	0.030 mg/L - Total	EPA Method 908.0, 908.1		7440-61-1[l]	+/- 20%[j]	+/- 25%[j]
	Iodine-129 (I-129)	1 pCi/L	EPA Method 901.1 (TIMS[m])	0.1 pCi/L	15046-84-1	+/- 20%[j]	+/- 25%[j]
	Plutonium (Pu) & daughters	15 pCi/L - Total	Alpha Spectrometry	0.2 pCi/L	7440-07-5[l]	+/- 20%[j]	+/- 25%[j]
	Strontium-90 (Sr-90)	8 pCi/L	EPA Method 905.0 (GFP[i])	1 pCi/L	10098-97-2	+/- 20%[j]	+/- 25%[j]
	Americium-241 (Am-241)	15 pCi/L-	Alpha Spec.	4 pCi/L	14596-10-2	+/- 20%	+/- 25%[j]
	Carbon 14 (C-14)	2,000 pCi/L	GFP; LSC	1,000 pCi/L	14762-75-5	+/- 20%	+/- 25%[j]
	Technetium-99 (Tc-99)	900 pCi/L	GFP[i]; LSC	10 pCi/L	14133-76-7	+/- 20%[j]	+/- 25%[j]
	Tritium (H-3)	20,000 pCi/L	EPA Method 906.0 (LSC[n])	400 pCi/L	10028-17-8	+/- 20%[j]	+/- 25%[j]

a. Practical quantitation limit (PQL) based on 25 mL sample volume.

b. Laboratory Accuracy and Precision to be determined based on laboratory selected for the analysis.

c. Sampled every 5 years per the TRA ROD.

Table 6-3. (continued)

Contaminant Type	Contaminant Name	Action Level (MCLs)	Analytical Method	PQL Required (50% or less of MCL)	CAS#	Accuracy (%)	Precision (%)
For Sitewide groundwater sampling and analysis							

d. SDWS = Secondary Drinking Water Standard

e. Via EPA Document No. EPA-600/4-79-020 and/or EPA-600/R-04/111 Methods in conjunction with INEEL ER-SOW-156 specification for Sample Delivery Group (SDG) Type 1C data.

f. Via Standard Method Part 4500 F (Method C, D, or E) of EPA Method 300.0 Revision 2.1, 340.1, 340.2, or 340.3 in conjunction with INEEL ER-SOW-156 specifications for SDG Type-3 data.

g. Via American Society for Testing and Materials (ASTM) Standard Method D 3867-90 (Method A or B), Standard Method Part 4500- NO3 (Method D, E, F), or EPA Method 300.0 (Revision 2.1) or 353.2 (Revisions 2.0), in conjunction with INEEL ER-SOW-156 specifications for SDG Type-3 data.

h. CAS# represents the Nitrate (NO_3^-) ion.

i. GFP = gas flow proportional counting.

j. The reported total uncertainty for radioanalytical results gives the range where the true value should fall. The reported results hinge greatly on the counting statistics achieved for the measurement.

k. No specific CAS# available.

l. CAS# represents parent radionuclide.

m. TIMS = Thermal ionization mass spectrometry.

n. LSC = Liquid scintillation counting.

o. Based on "1 in 10,000" risk-based action levels from the USEPA Integrated Risk Information Service.

p. TNT = trinitrotoluene.

q. RDX = royd demolition explosive.

6.1.4 Step 4 – Define the Boundaries of the Study

The boundaries presented in Table 6-4 define the scope and applicability of the decisions made for this project.

Table 6-4. Boundaries of the Decision Statements for the WAG 10, OU 10-08 study.

Boundary	DS #	Description
Population of Interest	1, 2	Contaminated groundwater
Spatial	1, 2	Contaminated groundwater associated with INEEL releases
Temporal	1	Sampling will begin with the commencement of the approved FSP.
	2	The decision statement time frame will be until the time of preparation and submittal of the RI/FS document (FY 2008) with anticipated continuation as a post-ROD activity for the 100 years. The data will be evaluated and reported initially in the RI/FS. Subsequent evaluations to assess current/future compliance with the groundwater MCLs or other acceptable risk-based concentration will be performed annually and the results of the assessments will be summarized every five years as part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 5-year review
Scale of Decision	1	The scale of decision-making will be contaminated groundwater within the INEEL boundary with commencement of sampling per the FSP.
	2	The scale of decision-making will be contaminated groundwater within the INEEL boundary for FY-02 and through 08 to support the ROD and continuation as post-ROD for the 100 years.
Practical Constraints	1, 2	Practical constraints may include site access restriction, monitoring equipment restrictions or limitations, or inclement weather, schedule to meet inclusion of data in the RI/FS.

6.1.5 Step 5 – Develop a Decision Rule

The decision rules below incorporate actions levels and analytical parameters. Groundwater MCLs are identified as the action levels for the contaminants of this study. The parameters that will be analyzed are listed in Step 3 of this document. Additionally, the following decision rules use the maximum concentrations as the parameters that characterize the population of interest.

For Decision Statement #1 – The nature and extent of all contamination plumes within WAG 10, OU 10-08 are defined:

- Decision Rule #1a – **IF** the nature and extent of contamination are adequately (e.g., the number of wells defines the boundary of contamination, wells are located outside of this boundary and are non-detect for target analytes, and wells beneath source areas have been sampled for all analytes found in soil/surface contamination at the corresponding source location) defined within the INEEL boundary, **THEN** existing monitoring data and information can be used to assess current/future contaminant compliance with MCLs or other acceptable risk-based concentration.

- Decision Rule #1b – **IF** the nature and extent of contamination are not adequately defined within the INEEL boundary, **THEN** additional monitoring data and information are needed to assess current/future contaminant compliance with MCLs or other acceptable risk-based concentration.

For Decision Statement #2 – The maximum groundwater contamination concentrations within the INEEL meet MCLs within 100 years:

- Decision Rule #2a – **IF** the body of evidence (i.e., plume-specific monitoring data, modeling results, and risk assessments) evaluated during annual groundwater monitoring data reviews indicate that groundwater MCLs or other acceptable risk-based concentration will be achieved within the INEEL boundary within 100 years, **THEN** revisions to groundwater monitoring may be made based on the regulatory agencies evaluation of the data.

- Decision Rule #2b – **IF** the body of evidence (i.e., plume-specific monitoring data, modeling results, and risk results) evaluated during annual groundwater monitoring data reviews do not indicate that groundwater MCLs or other acceptable risk-based concentration will be achieved within the INEEL boundary within 100 years, **THEN** the agencies will be notified and groundwater monitoring, contaminant modeling, and risk assessment will be continued or expanded through the next CERCLA 5-year review effort and/or potential alternative remedial actions will be evaluated and implemented as necessary.

6.1.6 Step 6 – Specify Tolerable Limits on Decision Errors

Engineering judgment estimates that there is 90% confidence associated with the identification of the COPCs that will be evaluated for compliance with MCLs. The primary concern for the nature of plume contamination is the possibility of errors of omission (i.e., contaminants not identified in the historical records or analytical analyses).

Confidence in modeling estimates of plume extent or compliance with MCLs would be contingent on the quality of data inputs (i.e., laboratory quality assurance/quality control) and would be consistent with the variances associated with the models employed.

6.1.7 Step 7 – Optimize the Design

The following discussions define the design assumptions, data collection design alternatives, and groundwater modeling strategy for WAG 10, OU 10-08.

6.1.7.1 Design Assumptions. The design detailed below incorporates the following assumptions:

- Limited groundwater monitoring data will be collected to assess INEEL sitewide boundary and perimeter groundwater quality, but this data will not be used for contaminant transport modeling unless concurrence from the agencies is obtained.

- The current wells are sufficient for monitoring the INEEL boundaries. If current wells are determined to be insufficient to adequately monitor the INEEL boundaries, new wells may be required in the future. Also, if new sites are added to OU 10-08, then additional groundwater wells may be needed.

- The data collected does not require risk assessment as compliance with MCLs is based on current and future success of groundwater remediation by the other WAGs.

- There are no ecological receptors for groundwater.
- Reviews of groundwater risks are conducted by each of the other WAGs.
- Some contaminants of concern may exceed the MCLs or acceptable risk levels for groundwater below the INEEL within the 100 yr time frame. Access to the groundwater will be controlled to eliminate potential pathways to receptors. Institutional controls may be required to ensure control of potential receptor pathways.
- Site-wide groundwater modeling efforts may have to be revised to incorporate new information.
- The groundwater modeling efforts will include a regional groundwater flow model that models groundwater flow into and out of the site.
- Vertical contaminant profile data from new or existing wells will be included if available from the other WAGs.
- The groundwater model will be provided subregionally and will be tied to preferential flow in order to better define the potential contaminant migration pathways.
- The monitoring results, plume locations (extent), qualitative risk results, and MCL compliance estimates will be presented in the RI/FS report with subsequent assessments provided in an annual WAG 10, OU 10-08 monitoring report.

6.2 General Data Collection Design Alternatives

Under the 2012 plan, the schedule to begin development of the OU 10-08 RI/FS report would be in FY 2007 with transmittal of the Draft report to the Agencies in FY 2008. Therefore, the work plan tasks will be conducted between FY2002 and FY2007. The first tasks would evaluate historical data to help identify data gaps and conduct activities to fill these data gaps if required.

6.2.1 Groundwater

One of the critical data gaps currently known is the lack of consistent or accurate groundwater elevation measurements. This gap will be addressed by taking water level measurements using consistent methods. Another gap is the analytical groundwater data available that will be filled through consistent sampling of existing wells using the same processes and laboratory analyses and installation of new monitoring wells where no wells exist. Some of the probable areas for additional data needs are at the upgradient and downgradient INEEL boundaries, in vertical sampling gaps in the deeper portions of the aquifer, and in possible location along localized structural trends that may be moving groundwater in a direction different than the regional groundwater flow direction. All available groundwater data from groundwater sampling events and measurements will be incorporated into the OU 10-08 Sitewide groundwater evaluation process. This existing data will be plotted on a Sitewide basis to determine the location and trends of existing groundwater contaminant plumes and locations of potential data gaps.

Subsurface investigation is needed to support the OU 10-08 RI/FS discussion of the commingling of contaminant plumes from WAGs 1 through 9 at a WAG 10-scale for cumulative risk. Information currently available indicates that there is little to no interaction between the plumes. However, early characterization efforts indicated the opposite being true. The installation of additional wells will support the near-term design of the planned WAG 10-scale groundwater monitoring network, identify data gaps, and quantify the relative value of additional data. The identification of sub-regional-scale data gaps and support of the WAG 10 monitoring network design also fills the needs of the new WAG 10 model. It is recognized that fulfilling the data deficiencies may become the key to providing a strong defensible risk assessment of potential impacts the groundwater may have outside the current INEEL boundary or within local areas of the INEEL.

Different types of wells will be drilled for the varied data gaps. Deep wells will be drilled and sampled at discrete intervals to profile the vertical distribution of analytes in the aquifer. Data from groundwater sampling will be utilized to evaluate the location and movement of potential and known contaminants upgradient or downgradient from the INEEL boundary. Monitoring wells will be drilled to allow monitoring of the aquifer at different depths. The input parameters to the OU 10-08 sub-regional conceptual model and constraints will be revised to reflect any pertinent changes made to other WAG models.

The field work tasks currently identified in this RI/FS Work Plan include sampling and analysis of monitoring wells, data validation, obtaining water level measurements, drilling additional guard and perimeter wells, and measuring deviations in existing critical wells. The modeling tasks include data compilation and development of an integrated sub-regional flow model to address saturated groundwater flow into and out of the INEEL area.

WAG 10 will coordinate with other programs on its current modeling activities in order to improve our understanding of flow in the Snake River Plain aquifer. The following are primary near-, intermediate-, major issues and long-term objectives:

- Determine active aquifer thickness
- Determine location, thickness, and continuity of interbeds and rubble zones
- Better define the heterogeneity of the aquifer hydraulic parameters and the appropriate scale of the modeled heterogeneity
- Determine the aquifer's flow path
- Collect and verify information on the temporal variations in the groundwater.

6.2.1.1 FY2002 Groundwater Well Installation – Deep-Shallow Well Cluster at TRA.

OU 10-08 proposes to install a deep – shallow well cluster approximately 4,620 feet south and 3,000 feet west of the TRA Facility (Figure 1) in FY2002. A significant source of groundwater contamination at TRA was from18 years of deep well injection of liquid wastes (TRA-05) containing hexavalent chromium (Cr(VI)). The purpose of the injection well was to inject wastewater from the secondary cooling system and the cooling tower blowdown. The TRA-05 injection well was drilled and cased to a depth of 1,268 ft and the casing perforated from 1,183 bls to 1,265 ft. It is estimated that 40,000 pounds (14,121 kg) of Cr(VI) was injected directly into the aquifer between 1964 and 1971. The injection well was evaluated in a Track 2 with a no further action determination. However only the actual sediment in the well was evaluated. Analysis was not performed on the waste that did not remain in the well. Since Cr(VI) is very mobile and has not generally been detected in the few aquifer monitoring wells downgradient of TRA, it is suspected the plume has migrated deeper in the aquifer and down gradient from the injection location.

The current monitoring network is restricted to sampling only the upper portion of the aquifer. Results of historic and current groundwater monitoring in the vicinity of TRA cannot account for the estimated quantity of chromium injected to the aquifer. TRA is the only site at the INEEL with deep well injection of waste that does not have the capability of deep aquifer monitoring.

There is evidence supporting the assumption that Cr concentration in the aquifer increases with depth, as USGS-65, which is very close to TRA-06 and is also 65 ft deeper, has consistently shown higher Cr contamination. In addition, contamination injected through the TRA injection well may also be confined to the lower portion of the aquifer if the HI interbed extends over this area.

Although regional groundwater flow is to the west/southwest, downgradient from TRA the monitoring capability is very limited. In the general down gradient direction from TRA is the Hwy 3 well, which is a public drinking water source, and the Subsurface Disposal Area (SDA) at the Radioactive Waste Management Complex (RWMC). Several aquifer monitoring wells in the SDA vicinity show elevated chromium which could be from TRA or from the SDA. Additional information on groundwater flow directions and quality is required to determine if contamination from TRA is migrating beyond the existing network of monitoring wells, which could threaten a public drinking water supply and/or affect groundwater quality in the vicinity of the SDA.

The project requires collection of new field data at TRA to address these critical data gaps, which are key to providing a strong defensible risk assessment of potential impacts the groundwater inside and outside the current INEEL boundary. The proposed deep-shallow well cluster at TRA will achieve the following:

1. Characterize the vertical distribution of contaminant concentrations in the aquifer at approximately 100 ft intervals or as directed by the onsite geologist, beginning at a point equal to the static water level to a depth of 1,500 ft.

2. A monitoring well with a dedicated sample interval at the approximate depth of the TRA-05 injection well [~1,300 ft below land surface (bls)].

3. A monitoring well may be installed with a dedicated sample interval between the deep set and the skimmer set intervals if the analytical results from the vertical contaminant profiling show detectable levels of contamination.

4. Monitoring well(s) will be completed with multiple sampling and screened zones or nested well sets to monitor groundwater zones, as necessary, based on site-specific subsurface information obtained during drilling.

5. A well with a dedicated sample interval in the shallow aquifer (25-50 ft below the aquifer surface) or at the first permeable zone. This sample interval will be an associate interval corresponding to the existing TRA monitoring net of TRA-6A. TRA-7, TRA-08, USGS-058, USGS-076, USGS-079, MTR Test, and Site 19.

6. Obtain a core drilled continuously from land surface to ~1500 ft bls for stratigraphic correlation and testing at the core library.

The requirements for selecting the location for the deep-shallow cluster wells at TRA are as follows:

- Downgradient from TRA injection well in the regional flow direction where it is estimated to intersect the contaminant plume from the TRA injection well

- Beyond the existing downgradient groundwater monitoring well network

- An area where there is a lack of subsurface geologic and stratigraphic information, which is critical to understanding groundwater flow and behavior.

Information obtained from installation of the deep-shallow cluster wells and analysis of groundwater and core material will provide the following for the OU 10-08 project:

- Advance knowledge of the stratigraphic framework and geologic architecture north of the Big Lost River and southwest of the TRA Facility

- Fill data gaps in the TRA/OU 10-08 monitoring net southwest of the TRA facility

- Establish criteria or baseline for addressing concerns from the lack of significant data about primary COC's (Cr-H3) between the TRA facility and Highway 3 –a public access well- from which the TRA injection well may have introduced contaminants below 1200 feet bls.

- Add data to the dynamic INEEL site-wide groundwater model in progress

- Further characterization of groundwater chemistry through vertical profiling.

6.2.2 Surface/Soil sites

For new sites evaluated before completion of the RI/FS report, the requirements set forth in the Track 1 and Track 2 guidance documents will be followed. If decisions cannot be made on Track 1 sites then the sites will be included in the RI/FS to ensure they are covered in the ROD.

There are no planned activities to collect new data from the TSF-08 site as current sampling methods are not believed to be viable to collect samples of elemental mercury. The data from the WAG 1 RI/FS process will be used for further evaluations.

6.3 Work Plan Activities

Data collection and data development tasks will be performed as detailed below for OU 10-08. The work plan tasks will focus on problem definition and, based on Agency comments during conference calls, will result in data to help define, evaluate, and decide on remedial action alternatives. The investigation approaches are detailed in the FSP for WAG 10, OU 10-08, which is an attachment to this work plan.

6.3.1 Work Plan Tasks

TASK #1 – Development of a Comprehensive Groundwater Sample Results Database. In order to adequately model, assess and track the groundwater monitoring and groundwater impacts on a site-wide basis, a comprehensive groundwater sample results database is needed to provide all the information necessary to adequately evaluate the groundwater information collected. Compiling groundwater analytical data into a single electronic database will allow for data from ERIS, USGS, individual WAG databases, ANL-West data and other sources as available to be included for evaluation.

TASK #2 – Evaluate Groundwater Data. Evaluate groundwater data to identify if existing analytical data can demonstrate compliance with MCLs, or other risk-based concentrations as appropriate, now and provide recommendations for improving the data set through post rod monitoring.

TASK #3 – Evaluate Alternative Groundwater Sampling and Purging Methodology. A significant cost and impact to the groundwater monitoring and sampling effort is the disposal of water that has been purged from the wells prior to sampling. This task will evaluate alternative groundwater well sampling and purging methodology to reduce the volume of purge water and/or provide more discrete data from specific zones within the aquifer. A strategy will be developed for cost effective management of purge water that will result from the groundwater sampling activities.

TASK # 4 – Evaluate Potentially Commingled Plumes. This task will use current data from the database and data provided by the individual WAGs in an attempt to identify and plot areas where commingling of groundwater plumes may be taking place. The residual groundwater contaminants will be evaluated until 2095 to ensure compliance with MCLs, or other risk-based concentrations as appropriate, throughout the INEEL.

Vertical profile sampling of new wells will be conducted to evaluate the vertical extent of a contaminant plume in order to better evaluate the potential for commingling plumes. Vertical profile sampling conducted by individual WAG's will also be used, if available. The available data will be evaluated to determine the need for additional vertical profile sampling or for multiple well completion zones or nested well sets. The plans for these wells will be discussed with the Agencies.

TASK #5 – Evaluate Groundwater Quality for Current Compliance with MCLs, or Other Risk-Based Concentrations. Evaluate the sitewide groundwater to assess compliance with the groundwater MCLs, or other risk-based concentrations as appropriate, at the downgradient and perimeter boundary wells using current data. WAG 10's primary responsibility will be to interact with the other WAGs to monitor success of the individual WAGs remedial action to control groundwater contamination. However, if groundwater is found to be impacted above MCLs or other acceptable risk-based concentrations after the individual WAG groundwater monitoring is turned over to WAG 10, the remedial methods selected for the WAG in their original ROD would be reinstated after notification of the problem to, and with the concurrence of, the Agencies. If a new impact or new site is identified that becomes the responsibility of WAG 10, a decision process and evaluation of alternatives will be prepared for review and concurrence by the Agencies.

TASK #6 – Method to Incorporate New Sites into WAG 10, OU 10-08. As various WAG areas complete additional subsurface investigations, as deactivation, decontamination and, decommissioning (D&D&D) activities are being carried out on abandoned buildings, and as other site-wide surface and subsurface surveys and investigations are completed, new and previously unknown sites may be found. A method will be developed in the OU 10-08 ROD by which these new sites can follow the Track 1 and Track 2 process in OU 10-08 post-ROD.

TASK #7 – Evaluation of Phytoremediation of Mercury in Soil at Site TSF-08. This task will review the results of earlier investigations and evaluations of the mercury in the soil at TSF-08 and review available literature to assess the viability of using phytoremediation for elemental mercury in desert gravels at this site and to collect data to assess food crop uptake for the baseline risk assessment. The results of this review will provide recommendations for a path forward for phytoremediation at TSF-08.

TASK #8 – Revise Sitewide Groundwater Model. The WAG 10 modeling will complement the modeling studies of the individual facility specific WAGs but is not intended to reproduce their risk assessment calculations. Rather, WAG 10-08 will focus on updating the new WAG 10 scale advective velocity field through integration of new information developed from regional, sub-regional, facility-specific WAG, and other studies. The advective flow velocity field will be used to estimate groundwater flow pathlines and velocities on the sub-regional scale, integrate smaller scale flow systems, obtain an

INEEL scale groundwater flow balance, assure flow consistency in the other WAG models, and provide support for the other WAG models groundwater flow boundary conditions

TASK #9 – Institutional Controls. Institutional controls are typically developed in combination with remedial action alternatives to help reduce exposure from residual contamination remaining after cleanup. Institutional controls may include long-term monitoring of activities associated with the site, visible access restrictions (such as signs), and control of land use, as determined to be appropriate. Institutional controls specific for OU 10-08 sites, will be developed within an institutional control plan following the OU 10-08 ROD; however, the development of a comprehensive institutional control approach is part of the scope of the OU 10-04 remedial design/remedial action and will likely reside in the OU 10-04 operations and maintenance plan. The institutional control period, under DOE control, is assumed to extend for a 100-year period or until a transfer from DOE occurs; unless controls are discontinued based on the results of a 5-year review. However, institutional controls will be necessary as long as an unacceptable risk remains or until cleanup levels have been achieved. The development of institutional controls in OU 10-04 will also take into account current and future land use. Many of the WAG 10 sites fall within the industrialized areas of the INEEL. The remaining areas of WAG 10, which are largely undeveloped, are used for environmental research, ecological preservation, sociocultural preservation, grazing, and some forms of recreation.

Each WAG at the INEEL that has completed a ROD has also completed an institutional control plan. Within these plans many site specific institutional controls are common to many of the WAGs. Commonalities include: visible access restrictions, access controls, activity controls (procedural and work control measures), property lease and transfer requirements, and inclusion in the INEEL comprehensive facilities and land use plan (site location boundaries). Operable unit-specific institutional controls will transition to site-wide institutional controls following the first five-year review. A comprehensive site-wide institutional control plan for CERCLA sites will be developed as part of the OU 10-04 effort.

The development of a comprehensive institutional control plan under OU 10-04 will take into account the current and future land uses of the INEEL. A majority of sites in each WAG fall within the industrialized areas of the INEEL and will not be used for environmental research, ecological preservation, sociocultural preservation, grazing, or for recreation. Much of the INEEL is likely to continue as an industrial and research facility and these WAGs will maintain their current land uses.

TASK #10 – Risk Evaluation for Groundwater. The process for site-wide groundwater risk assessment will be to identify contaminants and plumes of potential concern, their locations including any overlapping portions, and contaminant peak times from the comprehensive groundwater risk assessments previously conducted at each facility. This includes identifying any changes in contaminant concentrations from remedial efforts performed by each WAG and incorporating all other groundwater modeling efforts. Criteria for screening of contaminants and plumes from the site-wide evaluation will be outlined. Screening will be performed if appropriate risk-based criteria can be developed. The results of previous plume evaluations will be combined with newly collected data. Although the risks posed by most individual contaminant source have been evaluated, the individual evaluations are not necessarily consistent (with respect to conceptual models and assumptions) and, therefore, the risks cannot necessarily be accumulated to provide a cumulative risk. A process is being developed to model all the sources and provide comprehensive risk results. The process will use consistent conceptual models and modeling assumptions, as well as contaminant transport computational tools that have been used in past risk evaluations. Results of the modeling will include such things as the location of plumes and locations of the intersecting plumes (crossover areas) of contaminants of concern and their resulting concentrations in time. At each of these locations, areas with maximum concentrations, it will be assumed that a groundwater drinking well is present for residential exposure. The pathways of concern will include ingestion of groundwater and homegrown produce (as a conservative measure). Contaminants of concern will be analyzed using the most recent standard risk assessment methodologies for home grown produce outlined by EPA in 1999, and MCLs or other appropriate risk-based concentrations for drinking water. This assessment will address risk from multiple plumes and contaminants of concern across space and time.

TASK #11 – Verification of Water-level Measuring Points. The correct water-level measuring points, casing stickups, and well surveys for the all wells utilized for sitewide groundwater monitoring and sampling will be verified. Borehole deviation correction factors for all wells utilized for groundwater level monitoring will be compiled. Also, all wells with known or suspected deviations will be checked using the current USGS digital gyro instrument. In addition, wells that are part of the sitewide groundwater monitoring and sampling but are not suspected to be highly deviated will be evaluated using the USGS digital gyro when the pump is pulled from the well for routine maintenance.

6.4 Assumptions

In order to prepare the RI/FS documents in accordance with the FFA/CO schedule, many activities that were envisioned during the DQO process need to be considered as activities to be conducted post-ROD.

Key assumptions that will be utilized in the preparation of the RI/FS are as follows:

- USGS and historical data from ERIS are of acceptable quality for the decision making process for groundwater.
- The WAGs, which are the source of groundwater contamination plumes, will be successful in their remedial efforts. The WAGs will evaluate their remediation efforts in their respective 5-year reviews.
- If a new impact or new site is identified that becomes the responsibility of WAG 10, a decision process and evaluation of alternatives will be prepared and agreed to by the agencies.
- The OU 10-08 ROD will require institutional controls and subregional groundwater monitoring (based on the OU 10-04 Work Plan).
- Feasibility of groundwater remediation is evaluated separately by individual WAGs and OU 10-08 does not prepare an FS for groundwater.
- The FFA/CO approved schedule for OU 10-08 is not modified unless agreed to by the DOE and the Agencies.
- The schedule for OU 10-08 is tied to the submittal of the OU 7-13/14 ROD such that the OU 10-08 RI/FS and ROD will not be completed, submitted, or signed until signature of the OU 7-13/14 ROD over which OU 10-08 has no control.
- The OU 7-13/14 RI/FS and the OU 3-14 RI/FS will not be completed in time to support OU 10-08 RI/FS.
- OU 10-08 is designated as the operable unit to address remaining new sites as they are identified and carried through the Track 1 and Track 2 process.
- Ecological risk assessment is part of the OU 10-04 ROD.

- New ordnance sites will be considered as part of the OU 10-04 ROD. New ordnance sites that are not encompassed by the OU 10-04 ROD will be accommodated in OU 10-08 or some other ROD after signature of the OU 10-08 ROD.

- Waste generated during the WAG 10 OU 10-08 activities will be managed appropriately under CERCLA.

- Potential Post-ROD activities are as follows:

- Perform vertical profiling at selected wells to obtain information to assist in evaluation of the vertical extent of contaminants within the aquifer.

- Establish a network of existing sitewide groundwater monitoring wells for long-term monitoring of potential groundwater impacts throughout the INEEL for 100 years.

- Construct new monitoring wells sitewide to improve coverage in a sitewide monitoring network.

- Develop a long-term site-wide groundwater monitoring plan. This plan would be considered as the Remedial Design/Remedial Action Work Plan for groundwater.

- Evaluate and install automated water level monitoring instrumentation at selected sites.

- Evaluate and implement, where practicable, field screening technologies for monitoring groundwater contaminants.

- Evaluate the use of high-resolution satellite or aerial photographic for evaluation of the site to record disturbances that could be considered new potential waste sites. These techniques could be used to provide chronological documentation of site clean up activities.

6.5 References

DOE-ID 1999, Work Plan for Waste Area Groups (WAGs) 6 and 10, Operable Unit 10-04 Comprehensive Remedial Investigation/Feasibility Study (RI/FS), DOE/ID-10554, Rev. 0, April 1999.

EPA 2000, Data Quality Objectives Process for Hazardous Waste Site Investigations, EPA/600/R-00/007, U.S. Environmental Protection Agency.

7. SCHEDULE FOR COMPLETION OF THE OU 10-08 RI/FS

The proposed working schedule for submittal of primary and secondary documents and other activities is shown in Table 7-1 and Figure 7-1. This schedule is a working schedule agreed to by the Agencies in the OU 10-04 RI/FS Work Plan (DOE-ID 2000) as amended by the Environmental Management's Performance Management Plan for Accelerating Cleanup of the Idaho National Engineering and Environmental Laboratory (DOE/ID 2002). The underlying assumptions associated with this schedule and the impacts of changes are discussed below.

The working schedule for the OU 10-08 RI/FS and subsequent documents was prepared using the following assumptions:

- The working schedule is subject to acceleration depending on the extent of the data gaps and field activities outlined in the RI/FS Work Plan.

- All DOE headquarters, EPA, and IDEQ reviews of primary and secondary documents, as defined by the FFA/CO (DOE-ID 1991), will be subject to the appropriate 30 or 45 calendar day review, beginning the day after the documents are received by the agencies. Written responses to agency comments will be provided with the revised documents.

  - Impact of change: Submittal of documents will be done in accordance with Sections 8.16 through 8.18 of the FFA/CO.

- The working schedule provides for document deliverable dates on or before the enforceable deadlines in the letter EM-ER-02-110. The FFA/CO enforceable dates established for submittal of the following draft documents to EPA and IDEQ are:

  - Draft RI/FS Work Plan – April 2002

  - Draft RI/FS Report – March 2008

  - Draft ROD – December 2008

  Impact of Change: the working schedule may change. However, all deliverable documents will be submitted on or before the FFA/CO enforceable deadlines.

  Impact of change: Additional schedule changes to the WAG 7 OU 7-13/14 will impact the schedule of the OU 10-08 ROD.

- Review periods by EPA and IDEQ and comment resolution periods are taken from the FFA/CO Action Plan.

- Certain elements of groundwater fieldwork as defined in this work plan have already begun and will continue until May 2008.

Table 7-1. Proposed OU 10-08 RI/FS schedule.

Working Schedule	Date
Scoping Process	
Transmit Draft OU 10-08 RI/FS Work Plan to Agencies	1 Apr 2002*
Agency review of Draft Work Plan	1 Apr –15 May 2002
Agency comments on Draft Work Plan transmitted to DOE	15 May 2002
Revise Draft Final OU 10-08 RI/FS Work Plan	15 May –1 Jul 2002
Transmit Draft Final OU 10-08 RI/FS Work Plan to Agencies	1 Jul 2002
Agency Review of Draft Final OU 10-08 RI/FS Work Plan	1 Jul – 1 Aug 2002
OU 10-08 RI/FS Work Plan Becomes Final	1 Aug 2002
Implementation	
Draft OU 10-08 RI/FS Report Development	7 Aug 2002 – Feb 2008
Site-Wide Groundwater Remedial Investigation	7 July 2002 – Sept 2007
Transmit Draft OU 10-08 RI/FS Report to Agencies	March 2008
Agency review Draft OU 10-08 RI/FS Report	1 Apr 2008 – 15 June 2008
Agency comments on Draft OU 10-08 RI/FS transmitted to DOE	15 Aug 2008 – 15 June 2008
Revise Draft Final OU 10-08 RI/FS Report	15 June 2008 – 30 July 2008
Transmit Draft Final OU 10-08 RI/FS Report to Agencies	30 July 2008
OU 10-08 RI/FS Becomes Final	30 Aug 2008
Decision Process	
Submit Draft OU 10-08 Proposed Plan to Agencies	30 Oct 2008
Agency review of Draft OU 10-08 Proposed Plan	30 Oct – 31 Nov 2008
Public Comment Period on Proposed Plan	30 Nov – 30 Dec 2008
Draft OU 10-08 ROD submitted to Agencies	Dec 2008*
Agency review of Draft OU 10-08 ROD	1 Jan – 15 Feb 2009
Revise Draft Final OU 10-08 ROD	15 Feb – 30 Mar 2009
Submit Draft Final OU 10-08 ROD to Agencies	30 Apr 2009
OU 10-08 ROD Becomes Final	30 May 2009

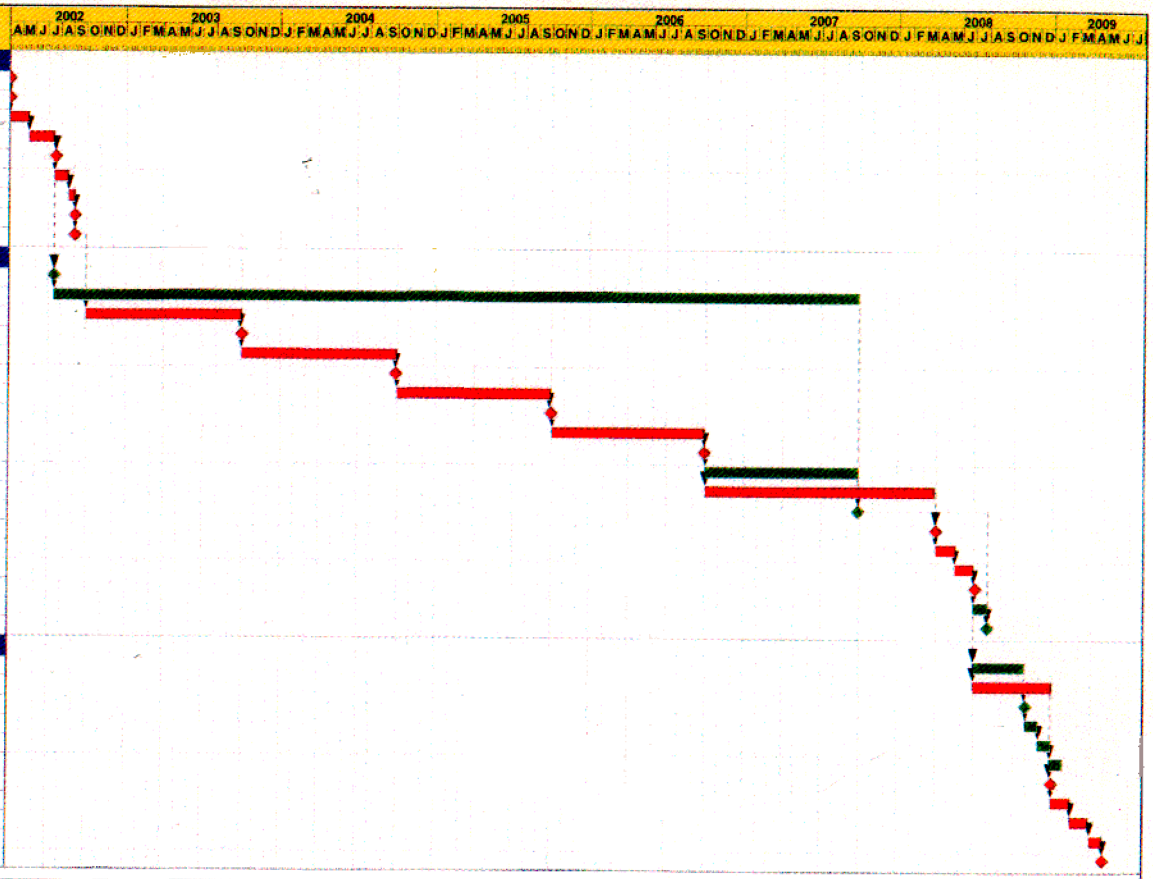
*Enforceable Milestone

Scoping Process	Working Schedule Start	Working Schedule Finish	Type	Enforceable Date
**Transmit Draft OU 10-08 RI/FS Work Plan to EPA and IDEQ (Primary Document)	March 29, 2002		Enforceable Milestone	April 2002
**Agency 45-Day Review of the Draft OU 10-08 RI/FS Work Plan	April 1, 2002	May 15, 2002		
**Incorporate Agency comments and Revise Draft Final RI/FS Work Plan	May 15, 2002	July 16, 2002		
**Transmit Draft Final OU 10-08 RI/FS Work Plan to EPA and IDEQ	July 17, 2002	July 17, 2002	Other Milestone	
**OU 10-08 RI/FS Work Plan Final	September 2, 2002	September 2, 2002	Other Milestone	
Implementation Process				
Transmit Annual OU 10-08 FY03 RI Report to Agencies	September 30, 2003		Other Milestone	
Transmit Annual OU 10-08 FY04 RI Report to Agencies	September 30, 2004		Other Milestone	
Transmit Annual OU 10-08 FY05 RI Report to Agencies	September 30, 2005		Other Milestone	
Transmit Annual OU 10-08 FY06 RI Report to Agencies	September 30, 2006		Other Milestone	
Transmit Annual OU 10-08 FY07 RI Report to Agencies	September 30, 2007		Other Milestone	
Complete Characterization Field Work for OU 10-08 RI/FS	September 28, 2007		Other Milestone	
**Transmit Draft RI/FS Report to EPA and IDEQ (Primary Document)	March 31, 2008		Enforceable Milestone	March 2008
**Agency 45-Day Review of the OU 10-08 Draft RI/FS Report	April 1, 2008	May 16, 2008		
**Transmit Draft Final RI/FS Report to EPA and IDEQ	July 1, 2008		Milestone	
**Agency 30-Day Evaluation/Approval of OU 10-08 RI/FS	July 1, 2008	July 31, 2008		
**OU 10-08 RI/FS Final	July 31, 2008		Milestone	
Decision Process				
Transmit Draft OU 10-08 Proposed Plan to EPA and IDEQ (Secondary Document)	October 30, 2008		Secondary Milestone	October 2008
Agency 30-Day Review of Draft OU 10-08 Proposed Plan	October 31, 2008	December 1, 2008		
Mail Proposed Plan to the Public	December 15, 2008	December 30, 2008		
30-Day Public Comment Period on Proposed Plan	December 30, 2008	January 27, 2009		
**Transmit Draft OU 10-08 ROD to EPA and IDEQ (Primary Document)	December 30, 2008	December 30, 2008	Enforceable Milestone	December 2008
**Agency 45-Day Review and Comment Period for OU 10-08 ROD	December 31, 2008	February 13, 2009		
**Transmit Draft Final OU 10-08 ROD to EPA and IDEQ	April 1, 2009	May 1, 2009	Other Milestone	
**OU 10-08 ROD Becomes Final	May 1, 2009	May 1, 2009	Other Milestone	

**Primary Document

Figure 7-1. Proposed working schedule for submittal of primary and secondary documents and other activities.

Activity ID	Activity Description	Early Start	Early Finish
Scoping Process			
100	Begin OU 10-08 Remedial	01APR02*	
110	Transmit Draft OU 10-08 RI/FS Work Plan to		01APR02
120	Submit Draft OU 10-08 RI/FS Work Plan to EPA	01APR02	15MAY02
130	Incorporate Agency comments and Revise Draft	15MAY02	16JUL02
140	Transmit Draft Final OU 10-08 RI/FS Work Plan		17JUL02
150	Agency 30 Day Review and Approval	17JUL02	16AUG02
160	15-Day Extention for Comment Incorporation	19AUG02	02SEP02
170	Transmit Final OU 10-08 RI/FS Work Plan to		02SEP02
180	OU 10-08 RI/FS Work Plan Final		02SEP02
Implementation			
190	Begin OU 10-08 Remedial Investigation Field	17JUL02	
200	Perform OU 10-08 Remedial Investigation Field	17JUL02	28SEP07
210	Annual OU 10-08 FY03 Remedial Investigation	01OCT02	30SEP03
220	Transmit Annual OU 10-08 FY03 RI Report to		29SEP03
230	Annual OU 10-08 FY04 Remedial Investigation	01OCT03	30SEP04
240	Transmit Annual OU 10-08 FY04 RI Report to		29SEP04
250	Annual OU 10-08 FY05 Remedial Investigation	01OCT04	30SEP05
260	Transmitt Annual OU 10-08 FY05 RI Report to		29SEP05
270	Annual OU 10-08 FY06 Remedial Investigation	03OCT05	29SEP06
280	Transmitt Annual OU 10-08 FY06 RI Report to		29SEP06
290	Annual OU 10-08 FY07 Remedial Investigation	02OCT06	28SEP07
310	Develop RI/FS Document W/Baseline Risk	02OCT06	28MAR08
300	Transmitt Annual OU 10-08 FY07 RI Report to		28SEP07
320	Transmitt Draft RI/FS Report to EPA and IDEQ		31MAR08
330	Agency 45-Day Review and Comment Period	01APR08	16MAY08
340	Incorporate Agency comments and Revise Draft	16MAY08	30JUN08
350	Transmit Draft Final RI/FS Report to EPA and		01JUL08
360	Agency 30-day Review of Draft Final RI/FS	01JUL08	31JUL08
370	OU 10-08 RI/FS Final		31JUL08
Decision Process			
380	Develop OU 10-08 Proposed Plan	01JUL08*	29OCT08
420	Develop Draft OU 10-08 Record of Decision	01JUL08	30DEC08
390	Transmit Draft OU 10-08 Propsed Plan to EPA		30OCT08
400	Agency 30-Day Review of Draft OU 10-08	31OCT08	01DEC08
410	Incorporate Agency Comments and Revise OU	02DEC08	30DEC08
430	30-Day Public Comment Period on Proposed	30DEC08	27JAN09
440	Transmit Draft OU 10-08 ROD to EPA and		30DEC08
450	Agency 45-Day Review and Comment Period	31DEC08	13FEB09
460	Incorporate Agency Comments and Revise	16FEB09	30MAR09
470	Transmit Draft Final OU 10-08 ROD to EPA and	01APR09	01MAY09
480	OU 10-08 ROD Becomes Final		01MAY09



Start Date	18NOV01
Finish Date	
Data Date	16NOV01
Run Date	29AUG02 11:31

Early Bar
Progress Bar
Critical Activity

RIFS

Sheet 1 of 1

OU 10-08 RI/FS

sp1

Date	Revision	Checked	Approved

Figure 7-1 (continued)

7.1 References

DOE-ID, December 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory*, U.S. Department of Energy, Idaho Field Office; U.S. Environmental Protection Agency, Region 10; Idaho department of Health and Welfare.

DOE-ID, March 1996, *Idaho National Engineering Laboratory Comprehensive Facility and Land Use Plan*, DOE/ID-10514, Department of Energy, Idaho Operations.

DOE-ID 2000, OU 10-04 RI/FS Work Plan

Appendix A

Waste Management Plan

CONTENTS

FIGURES

TABLES

Appendix A

Waste Management Plan

A-1. PURPOSE/INTRODUCTION

The purpose of this waste management plan is to establish requirements for the management and disposal of waste generated during sitewide well service activities performed under Waste Area Group (WAG) 10 work activities at the Idaho National Engineering and Environmental Laboratory (INEEL). The scope of this plan covers industrial, low-level radioactive, hazardous, mixed, and TSCA-regulated waste generated as a result of WAG 10 well service activities associated with WAG 10. Waste streams may be generated from wells both inside and outside of the various facility fencelines, and wells within and outside of the various contaminant plumes within the INEEL boundaries. This plan allows for dispositioning of waste at onsite CERCLA treatment and disposal facilities, or offsite disposal facilities when necessary. This plan also provides reference to the applicable waste management requirements that are contained in Department of Energy, Idaho Operations Office (DOE-ID) documents. The overall scope of the WAG 10 well service activities are covered in the WAG 10 work plan (DOE/ID TBD) the Sitewide Well Maintenance Plan (PLN- 785), and other activity specific work plans.

Activities that will likely generate waste include, but are not limited to the following:

- Well construction/installation and development
- Well maintenance
- Well decommissioning
- Decontamination of equipment and material
- Water-level and other in situ groundwater measurements
- Geophysical and video logging
- Groundwater sampling

This waste management plan addresses waste generated by WAG 10 well service activities at the INEEL and supercedes previously issued waste management or waste control plans for the groundwater monitoring related activities.

A-2. WASTE IDENTIFICATION

The wastes anticipated to be generated from the well service activities are summarized in Table G-1. This table describes the waste streams, provides the anticipated disposition pathway, and references the waste acceptance criteria (WAC) or guidance for management. Based on a review of the waste streams to be generated by well service activities, the following potential waste types are identified:

- **Industrial waste:** Solid waste generated by industrial processes, manufacturing, and support processes (40 CFR 243). At the INEEL, industrial waste to be disposed of at the INEEL Landfill Complex does not include hazardous waste, radioactive waste, or land disposal restricted waste regulated under Subtitle C of RCRA [INEEL Reusable Property, Recyclable Materials, and Waste

Acceptance Criteria (RRWAC) (DOE-ID 2000)]. Industrial waste generated during CERCLA investigation and remedial action will be managed as Investigation Derived Waste, and if shipped off the INEEL, will be subject to the CERCLA Off-Site Rule.

- **Low-level radioactive waste:** Waste that is not high-level radioactive waste, spent nuclear fuel, transuranic waste, byproduct material (as defined in Section 11e.(2) of the Atomic Energy Act of 1954, as amended), or naturally occurring radioactive material (DOE Order 435.1).

- **Hazardous waste:** Solid waste designated as hazardous by the U.S. EPA Resource Conservation and Recovery Act (RCRA) regulations (40 CFR 261.3).

- **Mixed waste:** Waste containing both radioactive components as defined by the Atomic Energy Act of 1954, as amended, and hazardous components as defined by 40 CFR 261.3.

- **TSCA waste:** Waste regulated under the Toxic Substance Control Act (TSCA) regulations. Presently, Polychlorinated Biphenyls (PCBs), asbestos, and Dibenzo-Para-Dioxins/Dibenzofurans are regulated under TSCA (40 CFR 761 and 763). While it is not anticipated that TSCA-regulated waste will be generated by well service activities, this wastestream is identified in the event that regulated levels of TSCA waste is discovered and would require management.

Table A-1. Possible waste generation and disposition.

Waste Description	Waste Type	Disposition Pathway[a]	Appropriate WAC/Guidance
Administrative waste (paper products, office waste)	Industrial waste	INEEL Landfill Complex	RRWAC
Uncontaminated monitoring waste (radiological swipes, mazzlins)	Industrial waste	INEEL Landfill Complex	RRWAC
Contaminated monitoring waste (radiological swipes, mazzlins)	Low-level, hazardous, mixed, or TSCA	ICDF landfill	ICDF landfill WAC
Uncontaminated PPE (gloves, boots, shoe covers, coveralls, etc.)	Industrial waste	INEEL Landfill Complex	RRWAC
Contaminated PPE (gloves, boots, shoe covers, coveralls, etc.)	Low-level, hazardous, mixed, or TSCA	ICDF landfill	ICDF landfill WAC
Petroleum-contaminated media (i.e., soil and PPE from hydraulic fluid spills)	Industrial waste	INEEL Landfill Complex	RRWAC
Contaminated equipment that cannot be decontaminated	Low-level, hazardous, mixed, or TSCA	ICDF landfill	ICDF landfill WAC
Maintenance-related wastes (from vehicles, equipment, facilities, etc.)	Various	INEEL Landfill Complex or off-site	RRWAC

Table A-1 (continued).

Waste Description	Waste Type	Disposition Pathway[a]	Appropriate WAC/Guidance
Uncontaminated investigative- or remediation-derived media (purge water, development water, drill cuttings, nonhazardous decontamination fluids and slurries)	Environmental media	Discharge water to ground; spread cuttings at site (reuse) or send to INEEL Landfill Complex	INEEL Management Standard for Disposal of Wastewater (DOE-ID 2001), waste determination, RRWAC
Contaminated investigative- or remediation-derived media (purge water, development water, drill cuttings, nonhazardous decontamination fluids and slurries)	Low-level, hazardous, mixed, or TSCA	Approved disposal facility off the INEEL (i.e., Envirocare, or Chemical Waste Management of the Northwest); on-site disposal will be considered if the waste meets acceptance criteria of an on-site disposal facility (i.e., RWMC), or can be treated to meet the acceptance criteria (i.e., stabilized).	WAC for the approved facility off the INEEL or on the INEEL
Contaminated sampling wastes (coliwasa, funnels, spoons)	Low-level, hazardous, mixed or TSCA	ICDF landfill	ICDF landfill WAC
Uncontaminated sampling wastes (coliwasa, funnels, spoons)	Industrial waste	INEEL Landfill	RRWAC
Spent or unusable (e.g., expired) chemicals and reagents	Industrial waste; low-level, Hazardous or mixed	INEEL Landfill, ICDF, or off-site	RRWAC; ICDF landfill or EP WAC
Miscellaneous waste (e.g., tools, debris, equipment, pumps, cables, concrete, wood, rebar, concrete, bentonite, sand, measuring equipment, screens, spent resins, filter elements, metal/plastic pipe, plastic sheeting, etc.	Industrial waste; low-level, Hazardous or mixed	INEEL Landfill or ICDF	RRWAC or ICDF landfill

a. The ultimate disposition is contingent upon meeting the appropriate WAC. If the waste does not meet the WAC and alternative on-site treatment and disposal locations are not available, then management at off-site facilities will be pursued.

b. Low-level/hazardous waste or low-level/TSCA waste.

A-3. WASTE DESIGNATION AND MANAGEMENT

Waste generated from groundwater management operations will be designated using process knowledge, historical analytical data, and/or analyses of samples. Prior to disposal, all waste must meet the applicable waste acceptance criteria for the disposal facility.

Wastewaters such as well purge water, development water and decontamination fluids that meet the criteria for discharge to the ground, as identified in the Idaho National Engineering and Environmental Laboratory Management Standard for Disposal of Wastewater (DOE-ID 2001) may be discharged to the ground near the point of generation. Uncontaminated drill cuttings and slurries will also be placed on the ground near the point of generation.

A-3.1 Industrial Waste

Solid waste and debris that is not contaminated (not a RCRA characteristic, listed, or mixed waste) and has been radiologically released as an industrial waste may be disposed of at the INEEL landfill complex, subject to meeting that facility's WAC. Industrial wastes generated by groundwater management operations will be transported to the INEEL Landfill Complex located at Central Facilities Area (CFA) for disposal. The waste must meet the current version of the "Idaho National Engineering and Environmental Laboratory Reusable Property, Recyclable Materials and Waste Acceptance Criteria (RRWAC)" (DOE-ID 2000) for disposal at the landfill. The RRWAC requires some industrial wastes to be segregated and managed as conditional industrial waste. Conditional industrial waste includes oil or fuel filters, petroleum-contaminated material from spills, asbestos-containing materials, or uncontaminated PPE.

A-3.2 Low-level Radioactive, Hazardous, Mixed and TSCA Waste

Contaminated (low-level radioactive, hazardous, mixed and TSCA) solid wastes (non-aqueous) that meets the ICDF waste acceptance criteria will be disposed of at the ICDF. Contaminated aqueous wastes that meet the ICDF or the TAN Portable Water Treatment Facility (PWTF) WAC will be managed at the applicable facility. Aqueous and non-aqueous waste not meeting the disposal requirements of the ICDF or the TAN PWTF WAC, as applicable, will be containerized, treated, and/or stored as necessary until appropriate disposal requirements are met. If management/disposal at these INEEL CERCLA facilities is not possible, these wastes may be sent to an INEEL or off-site facility for disposal, subject to meeting the applicable WAC and off-site criteria. Wells with contamination levels requiring subsequent management of wastes as low-level radioactive, hazardous, or mixed waste are identified in EDF-TBD. This EDF will be updated on an as-needed basis with new information that would cause a change in groundwater management. This would include changes in groundwater conditions impacting the management of the water, regulatory changes, or obtaining a no-longer-contained-in determination.

A-3.3 Waste Storage

While wastes are being actively generated by groundwater management operations, they will be temporarily managed and stored within the designated work area in containers appropriate for the wastes being generated. e.g., liquids that are hazardous or mixed waste require secondary containment, radiological wastes with high levels of contamination may require shielding. Waste compatibility will be determined during waste characterization and designation; incompatible waste will be segregated as required by RCRA container management regulations. Unless being actively filled, the containers shall remain closed at all times. The volume of waste stored at the site should be kept to a minimum. Full containers should be prepared for disposal as quickly as economically feasible.

When the waste containers are removed from the active work area, CERCLA wastes with RCRA waste codes or TSCA regulated may be transported to the ICDF for management in accordance with that facility's waste management plan. If ICDF storage is not feasible, the waste may be stored in a temporary storage area for CERCLA waste while awaiting subsequent management and disposal. If a temporary CERCLA storage area (CSA) is required, it will be located and managed in accordance with the substantive requirements of RCRA and TSCA, as applicable, for temporary storage of waste. For example, if CERCLA waste with RCRA waste codes is stored in a CSA, then the following items shall be located, tested, and maintained in operable condition, unless none of the hazards posed by the waste would require the item:

1. Posting a current copy of the registration at the CSA

2. Communications, spill control and safety equipment, as identified in the Safety and Health Plan.

3. "NO SMOKING" signs at or near a CSA that stores ignitable or reactive waste.

Additional requirements include appropriate management of containers at the CSA that includes the following:

1. Maintain the containers in good condition

2. Do not store waste that is incompatible with containers or container liners or place the waste in a container that previously held an incompatible waste or material.

3. Keep all containers closed except when adding, removing, sampling, or measuring waste.

4. Do not mix incompatible wastes

5. Maintain sufficient aisle space (minimum of 28 inches) to allow the unobstructed movement of emergency equipment and personnel.

6. Do not open, handle, or store any container in a manner that will cause it to leak.

7. Perform and document weekly CSA inspections by qualified personnel.

If PCB waste is stored in a CSA, the waste shall be stored only in areas that have an adequate design. This includes the following:

1. A floor with continuous curbing a minimum of 6 inches high. The floor and curbing need to provide containment of at least two times the internal volume of the largest PCB article or PCB container or 25% of the internal volume of all PCB articles or PCB container, whichever is greater.

2. A determination that there are no drains or other openings that would permit PCBs to flow from the curbed area.

3. Marking each entrance to the CSA with a large PCB M_L mark.

4. Locating the CSA outside of the 100-year floodplain.

The temporary storage area will be inspected weekly by personnel trained in the management of a CERCLA waste storage area. Recordkeeping will be performed to document the weekly inspections, condition of containers, observations, and correction of any previously noted deficiency or issue. The

CSA will be signed and access controlled to ensure there is no unauthorized access by untrained personnel.

A-4. WASTE PACKAGING, LABELING AND TRANSPORTATION

Containers that store the CERCLA waste must be in good condition, compatible with the waste being stored, and properly labeled. It is important that containers and method of packaging are also compatible with final disposition plans and applicable U.S. Department of Transportation requirements. Drums or boxes with liners may be used for some materials such as contaminated drill cuttings. However, packaging for large or irregular-shaped waste such as contaminated well casing may include containment other than drums prior to packaging. The packaging is to protect against migration of contaminants and protection from environmental degradation. This may include, but is not limited to, plastic wrap. Low-volume contaminated miscellaneous wastes associated with activities such as groundwater well sampling, water level measurements, and groundwater well maintenance may be bagged, taped and labeled with the well number. To reduce the number of separate bags, similar waste streams may be combined and accounted for in one bag or container, in consultation with Waste Generator Services personnel. This bagged material will be transported in a protective manner (i.e., containment of the material is maintained) by the workers while proceeding from well to well. Upon arrival at the storage location, the materials will be placed in an accumulation container and managed as waste.

Containers will be labeled and marked appropriately to match the designation established for each waste stream. Radiation labels shall be placed on containers as required by the current version of the INEEL Radiological Control Manual (INEEL 2000). Uncontaminated wastes will be placed in containers marked as "Cold Waste." Containers will be marked with labels identifying them as "CERCLA Waste" if contaminated or as "Cold waste" if uncontaminated.

CERCLA waste labels shall also include appropriate information such as an accumulation start date, waste description, applicable waste codes or TSCA markings, and the generator or project name. Figure G-1 provides an example of a CERCLA waste label. A barcode from the INEEL waste tracking database (Integrated Waste Tracking System) will also be placed on the container to facilitate management. Prior to transportation, the boxes and containers shall, at a minimum, be labeled on one side with the "CERCLA Waste" label and the IWTS sticker (visible side labeled).

Packaging and labeling for transportation shall meet that U.S. Department of Transportation requirements, as appropriate. Packaging exceptions to the U.S. Department of Transportation requirements that are documented and provide an equivalent degree of safety during transportation may be used for onsite waste shipments. Containers will be labeled and marked appropriately to match the designation established for each waste stream.

CERCLA WASTE Waste Code(s):______________________________ Date Placed in Storage: _______________________ Waste Form: (liquid, solid, soil, PPE, Etc.): _______________________________________ For Information Contact: ______________________ ____

Figure A-1. Example of CERCLA Waste Label.

A-5. WASTE MINIMIZATION AND SEGREGATION

Waste will be minimized primarily through design, planning, and efficient operations. For example, a key element to minimizing generation of sampling water is the use of a micropurge sampling system that generates minimal volumes of discharge water during sampling activities. Reuse and recycling opportunities will be evaluated for waste such as batteries, scrap metal or equipment or materials that are no longer needed. Uncontaminated equipment that is determined to be excess will be evaluated for reuse by other INEEL projects or government surplus sale. This would include pumps, pipe, electrical cable, and monitoring equipment.

A-6. REFERENCES

40 CFR 243, Code of Federal Regulations, "Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Waste."

40 CFR 261.3, Code of Federal Regulations, "Definition of Hazardous Waste."

40 CFR 761, Code of Federal Regulations, Title 40, "Protection of Environment, " Part 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce and Use Prohibitions."

40 CFR 763, Code of Federal Regulations, "Asbestos."

DOE Order 435.1, "Radioactive Waste."

INEEL Management Standard for Disposal of Waste Water, DOE/ID, 2001.

INEEL Radiological Control Manual, 2000.

INEEL Reusable Property, Recyclable Materials, and Waste Acceptance Criteria (RRWAC) (DOE-ID 2000).

INEEL Sitewide Well Maintenance Plan (PLN-785).